JUNE 16, 1952

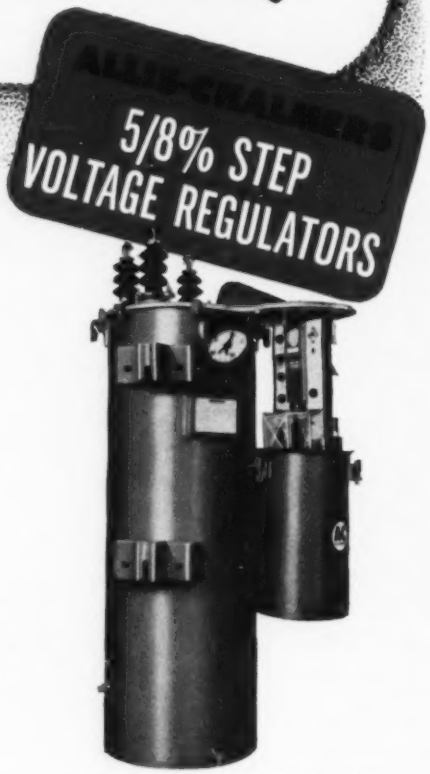
Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

B. L. England President, Atlantic City Electric Co
NEW PRESIDENT Edison Electric Institute

We Increased Revenue ...Eliminated Complaints due to Low Voltage



Electric Power Executive Reports:

"We have regulated our entire system with Allis-Chalmers AFR (power) regulators and JFR (distribution) regulators and we have noticed a substantial increase in revenue.

"Also, we have completely eliminated complaints due to low voltage and this alone is worth the small cost of the regulators."

Application-proved advantages of Allis-Chalmers ⅝% step voltage regulators assure you of properly regulated voltage. The narrow ± 1 volt band provides accuracy. The voltage integrator permits the regulator to meet specific load conditions. 20% range of regulation makes it possible to boost capacity, or to extend feeder length at minimum expense.

PROFIT FROM YEARS OF A-C EXPERIENCE

Twenty years of design and development give you proved advantages in durability. Take the tap-changing mechanism for example. It has stood up under life tests of 5,000,000 operations — equivalent to 100 years of normal service.

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A-3747

Allis-Chalmers Distribution Regulator

RATINGS AVAILABLE	
	7620 VOLTS — 15-30-100 AMPS
	5000 VOLTS — 30-100 AMPS
	2500 VOLTS — 100-200 AMPS

ALLIS-CHALMERS

Originators of ⅝% Step Regulation

B. L. England
EEI's New President

To a lot of people, in the East at least, Atlantic City spells "two weeks with pay." By the thousands every summer, armed with an appetite for fun, they head for New Jersey's Bagdad-by-the-Sea.

One might be excused for the belief that any power company, such as Atlantic City Electric Co, serving such a vacation spot would have a highly seasonal load. Before World War II this was true. Resort business comprised 55% of ACE's revenue. Today this picture is changing rapidly. Under the influence of a young, progressive management, ACE's territory has expanded. Now it encompasses the southern third of the state. From inland areas are coming diversified agricultural and industrial loads that diluted the resort business to 35.5% of last year's total and may cut it to 30% by 1955.

Heading this aggressive independent company is B. L. England, EEI's new president.

"Pat" England is an engineer, backed by three decades in the electrical industry. Born in Newark in 1903 and graduated from Temple University, England went to ACE as a clerk in 1922. Two years later he become distribution engineer, in 1929 division manager, and in 1935 commercial manager. Six years later Pat became vice-president and assistant general manager and director, and in 1942 president and general manager.

Since 1949, England directed ACE's reorganization following its separation from the American Gas & Electric System. He has supervised his company's $40 million expansion and recently completed its acquisition of Millville Electric Light Co.

Now Pat England moves on to new responsibilities of national scope. If we know Pat, he'll discharge them well!

Electrical World

Published for 78 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

Vol. 137 No. 24 — June 16, 1952

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Fewer replacements . . . less time lost . . . lower operating costs—that's what using Hazacord means to you. Regardless of the treatment it gets, mold-cured Hazacord has the "built-in" ability to absorb more punishment and stay on the job longer—that's why it's preferred for economical service on rugged industrial jobs everywhere.

Every Hazacord flexible cord and portable cable is protected with Hazard's exclusive Hazaprene ZBF sheath which means extra resistance to such common industrial perils as oils, acids, chemicals, moisture and weather. In addition, the Hazaprene sheath is *cured under pressure in a continuous metal mold*—the best method known to provide extra density, lasting toughness, a smooth, abrasion-resistant surface. And its high flame resistance more than meets the requirements of the Federal Bureau of Mines and the Pennsylvania Department of Mines.

There's a Hazacord flexible cord or portable cable for every need. Ask your jobber about Hazacords today. For the complete catalog of Hazacord flexible cords and portable cables EW-420, write to Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

Feel the embossed name Hazacord on the sheath—positive proof of a mold-cured cord. And mold-curing means extra long life to portable cords.

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for the largest number of line applications at the lowest possible cost...

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Insulating
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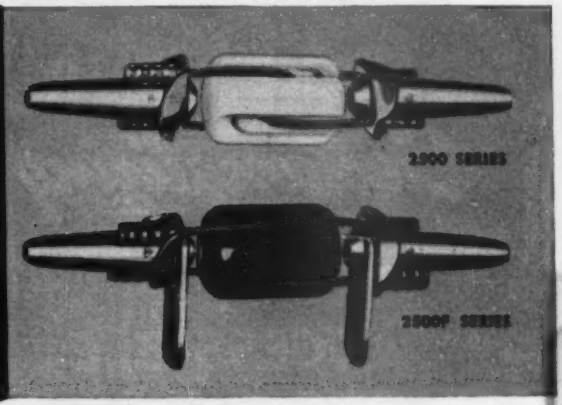
SECTIONALIZERS



The Electroline Sectionalizers are assemblies that will function in service as most convenient, reliable and yet low cost interrupting devices. Series 2500-F and 2600 provide for paralleling with a fuse element for further protection when sectionalizing. The mechanical strength of these assemblies exceeds in all cases the rated breaking strength of the conductor for which they are adapted.

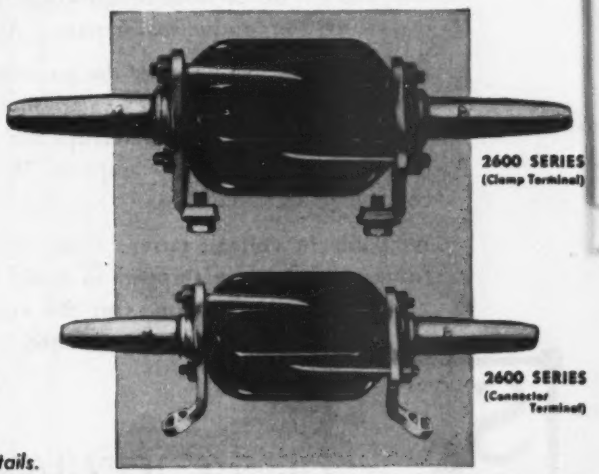
These Insulating Automatic Line Splice Sectionalizers are ideal for:

Installing Regulating Equipment,
simplifies cutting-in disconnecting points, fuses, voltage regulators and series capacitors;

Restoring Service,
providing points to test for trouble;

Sectionalizing Networks,
to readily isolate and test the area in trouble;

Series Street Lighting,
simplifies cutting-in series street lamps—merely cut the line and insert conductor ends into sectionalizer.



Send for Bulletins containing complete details.

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MAKE YOUR *Sectionalizing Switch* ACCESSIBLE

Whether you are putting up a new line—or simply adding a sectionalizing point to an existing line—avoid the limitations of horizontally mounted conventional air switches.

THE "ARC-FREE" ALDUTI INTERRUPTER SWITCH CAN BE MOUNTED VERTICALLY

If it's a "remodelling" job, you can keep service interruptions to a minimum by completing the switch installations with the line *energized.* In fact, interruptions can be eliminated completely if provisions are made for a sectionalizing point when the line is first constructed.

And whether the switch is going into new construction or an existing line, you get the obvious benefits of simple jumpering schemes to by-pass the switch for routine maintenance. Again, no service interruptions!

Of course, that's just part of the picture. Versatility of mounting is simply a by-product of the Alduti's *no-external-arc* switching ability. This switch can safely and positively interrupt line and cable charging currents, and load currents up to 600 amperes. With it you can revise your whole concept of sectionalizing.

Available in voltage ratings from 7500 through 34,500, Alduti Interrupter Switches are shipped in easily handled assemblies for quick installation. Get the complete story. Write for Catalog Section 760, or contact your S&C representative today.

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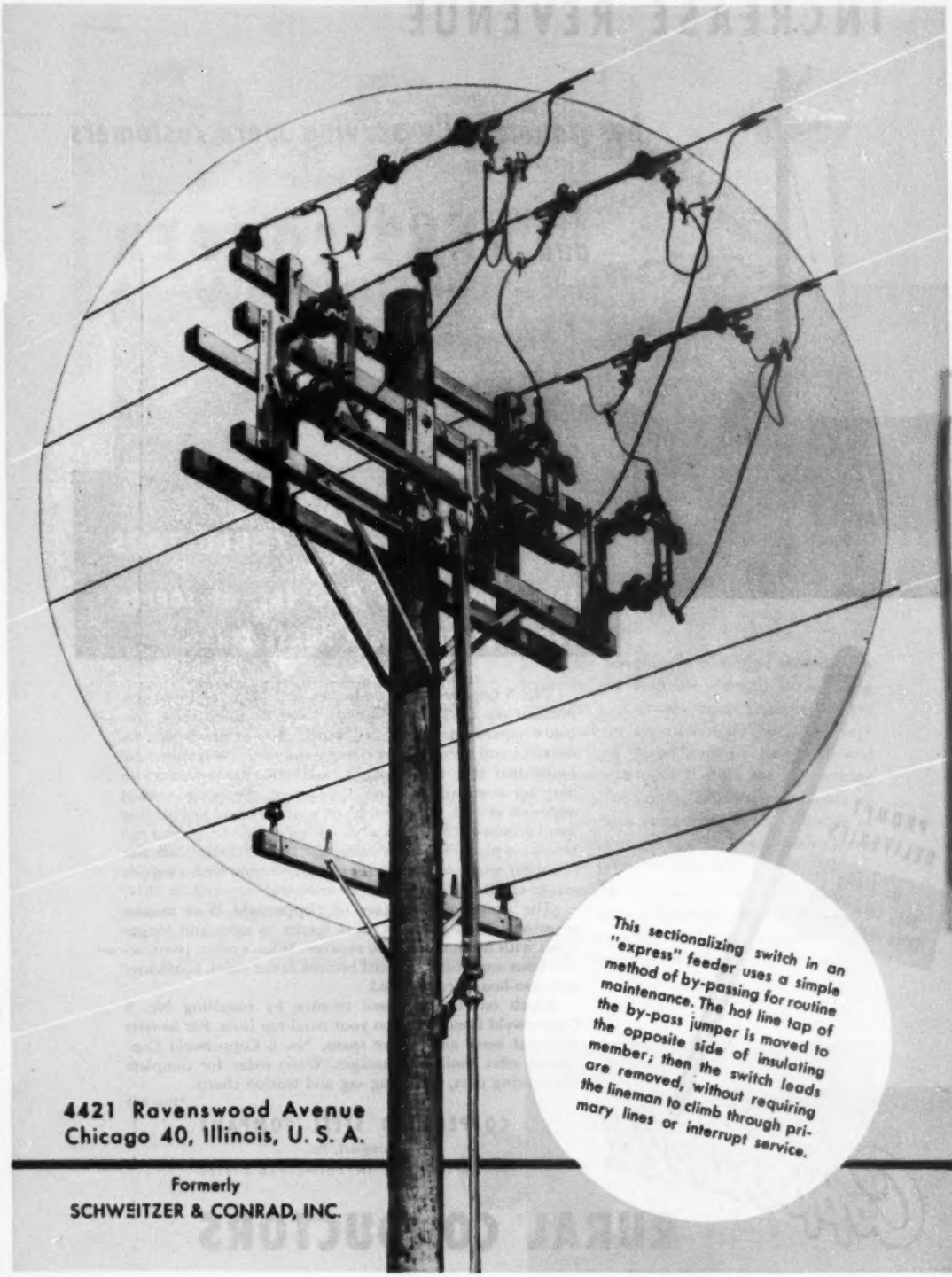
In Canada, Powerlite Devices, Limited, Toronto



This sectionalizing switch in an "express" feeder uses a simple method of by-passing for routine maintenance. The hot line tap of the by-pass jumper is moved to the opposite side of insulating member; then the switch leads are removed, without requiring the lineman to climb through primary lines or interrupt service.

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SCHWEITZER & CONRAD, INC.

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by economically serving more customers

and SAVE COPPER

№ 8 Copperweld® CONDUCTORS

SAVE YOU NEARLY 700 LBS. OF COPPER PER MILE OF SINGLE-PHASE LINE

No. 8 Copperweld* Conductors will help you build economical tap lines in low-density areas. By using these low-cost Copperweld Conductors, which provide plenty of conductance and strength for primary taps, many companies have found that they can profitably take on more customers in outlying communities—and conserve on the use of critical materials as well. For example, on a single-phase line serving small groups of customers, a No. 8 Copperweld Conductor can be used in place of No. 6 Awg copper, the usual minimum size of copper wire used for overhead construction, with a copper saving of nearly 700 pounds per mile.

The protected steel core of Copperweld Wire assures permanent high strength. This results in safer and longer spans with less maintenance expense. What's more, construction costs are greatly reduced because fewer poles, accessories and man-hours are required.

Reach out for increased revenue by installing No. 8 Copperweld Conductors on your rural tap lines. For heavier electrical loads and longer spans, No. 6 Copperweld Conductors offer similar advantages. Write today for complete engineering data, including sag and tension charts.

*Trade Mark

COPPERWELD STEEL COMPANY
Glassport, Pa.
SALES OFFICES IN PRINCIPAL CITIES

Copperweld® TRADE MARK

RURAL CONDUCTORS

There's a Westinghouse meter for every application!

Forecasts of unprecedented load growth in the coming years suggest many changes in metering practices. That's why a *complete* line of metering equipment holds an advantage for you. Specifically . . .

It's assurance that your future as well as your present needs can be readily fulfilled.

The meters illustrated here are just a few of the broad line of Westinghouse Meters offered to you. These and many more types are available to give you low-cost metering for every circuit application . . . three wire, four wire, wye or delta, or totalizing.

To meet your expanding needs, Westinghouse has continually pioneered new devices to make the desirable changes in metering methods a practical reality. And you have assurance of dependability because every Westinghouse Meter contains the quality and refinements that result from the engineering of a complete line. So whether your needs involve metering large loads or small, single or polyphase circuits, kw or kva, Westinghouse can meet your requirements.

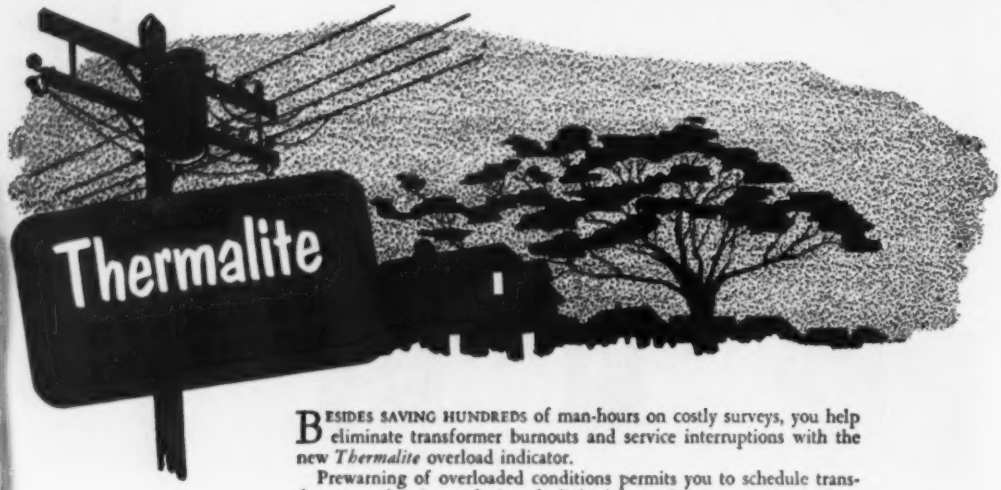
For more information write for Booklet B-4665. Call your Westinghouse Office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40412-A

Westinghouse

METERS

Here's the Low Cost Way

TO DETECT TRANSFORMER OVERLOADS



Time Saving Visual Check of Transformers with Thermalite Device Offers Permanent, Continuous and Inexpensive Load Check

BESIDES SAVING HUNDREDS of man-hours on costly surveys, you help eliminate transformer burnouts and service interruptions with the new *Thermalite* overload indicator.

Prewarning of overloaded conditions permits you to schedule transformer replacements during daylight hours. But in no case is there interruption of power service . . . because the *Thermalite* indicator operates purely as a signal device. It provides quick warning that the transformer should be replaced with a larger transformer or the load rearranged at the earliest convenient time.

Quiet in operation and simple in construction, the low cost *Thermalite* indicator is recommended for systems where more expensive devices are not feasible.

NOTE THESE IMPORTANT ADVANTAGES

1. The red warning light is actuated by a thermostatic element in the top oil. Light remains on until reset by convenient handle.

2. The device is engineered, calibrated and installed at the factory. It costs virtually nothing to maintain and it is dependable in operation.

3. It operates in all types of weather and is well protected from the elements. The brilliant light permits you to check overloading conditions visually from your service truck.

For more information contact your A-C sales office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

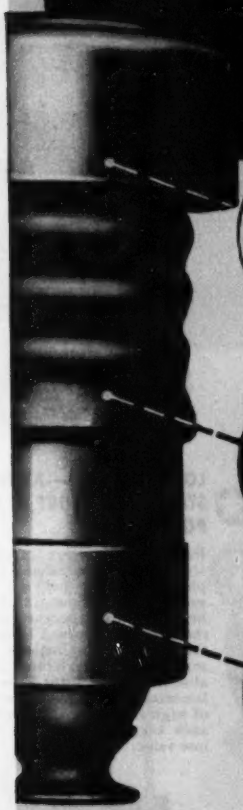
A-3492

Thermalite is an Allis-Chalmers trademark.

ALLIS-CHALMERS

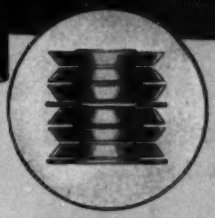
The Allis-Chalmers overload indicator is available on distribution transformers 100 kva and smaller, 15 kv and lower.

CRYSTAL VALVE ARRESTERS Give Lasting Protection

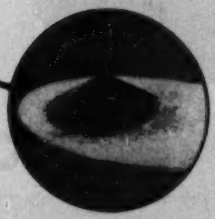


REASONS WHY:

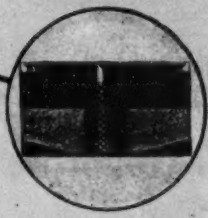
High Speed Multiple Arcing Unit
Crystal Valves embody time-proved spark gap units of multi-gap construction.



Oxidized Silicon Carbide Grain
Highly developed valve element is an exclusive feature of Crystal Valves.



Duplex Base Seal
Design feature prevents moisture from entering arrester despite severest weather conditions.



Month after month, year after year, Crystal Valve Arresters give you long lasting protection, plus all of the desired performance characteristics. Oxidized Silicon Carbide grain ideally suited for application as a valve element is found only in Crystal Valve Arresters. The true valve action is constant, unaffected despite extreme weather conditions. Split-second protection for your transformers, or other electrical equipment, is assured, preventing lightning "black-outs" from retarding service.

For efficient, reliable service, specify and use Crystal Valves on your power line equipment.

Write Dept. 1700 for latest technical data on lightning arresters and their installation. Ask for CV catalog. No obligation.

ELECTRIC SERVICE MANUFACTURING CO., PHILA. 32, PA.

CRYSTAL VALVE
LIGHTNING ARRESTERS

CRYSTAL VALVES FOR EVERY NEED

Wet process porcelain body types, in ratings for AC voltages from 300 to 25,000. Most ratings available in any combination of lead and stud terminal connections.

Glass body types, for 1,000 to 3,000 volts AC, allow easy inspection of spark gap assembly and other elements. Supplied only with line lead and ground stud terminals.

Porcelain-glass body types, for 6,000 to 15,000 volts AC. Characteristic element is in wet process porcelain section, ventilated spark gap is housed in glass for easy inspection.

Ventilated spark gap type, for 1,000 to 3,000 volts AC, permits free circulation of air in spark gap housing, keeping interior dry, clean and uncorroded.

Other types of Crystal Valve Arresters are available for AC voltages from 15,000 to 25,000. Regardless of housing and mechanical assembly, fundamental operating principles of all Crystal Valve Arresters are the same.

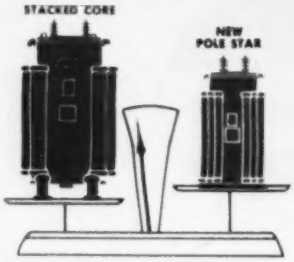
NOW..POLE STAR TRANSFORMERS

Pennsylvania's four new Pole Star distribution transformers are fundamentally the same as the original 3 to 100 Kva Pole Stars. Cores are wound of oriented electrical steel with core laminations individually lapped for low exciting current. In every Kva rating, the Pole Star is lighter in weight and smaller in size than the stacked core transformer it replaces. It is more economical to operate, less costly to store, and easier to install.

167 Kva

In Short, **The Pole Star is a Better Transformer . . . Operating with *Greater Efficiency* and at *Less Cost***

Exciting Current reduced 75%



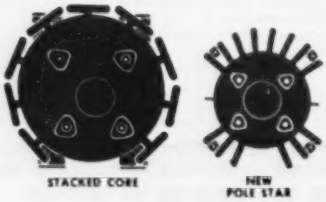
Weight reduced 2200 pounds

Compare

THE NEW 500 Kva POLE STAR WITH THE OLD 500 Kva STACKED CORE TRANSFORMER

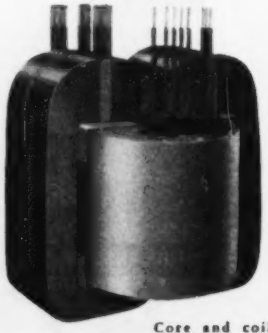
Oil Volume reduced 35%
125 gallons

Floor Area reduced 20%



LOW CORE LOSS—AN OUTSTANDING FEATURE OF THE POLE STAR

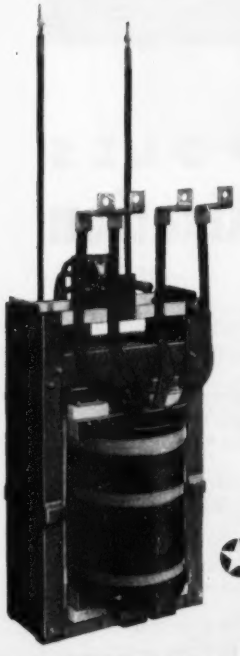
Pole Star cores are carefully annealed in controlled-atmosphere furnaces, but do not suffer the disadvantages of adhesions. That is because when the core is assembled through the coil, the laminations are separated from each other. The absence of adhesions between laminations and the presence of high interlamination resistance keep the core loss at a low value.

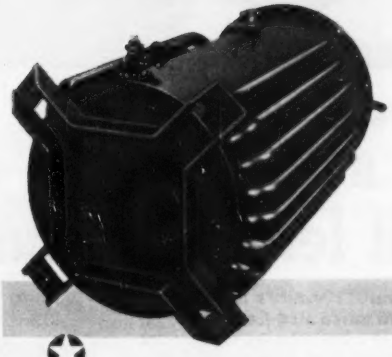


Core and coil assembly. Note lap joint at top of core.

PENNSYLVANIA TRANSFORMER

IN SIZES UP TO 500 Kva





NEW BASE FEATURES CROSS VENTILATION

Structural steel bars are welded to the tank bottom. Their arrangement permits the transformer to be rolled in any direction. Jack lugs extend beyond the tubes or radiators. Openings provide cross ventilation for the tank bottom and the base. The entire tank bottom is accessible through the openings for painting.

INTERNAL ASSEMBLY OF 167 KVA POLE STAR

Side frames completely enclose the core and provide a sturdy support for the entire unit. The Pole Star coil is designed for a low temperature gradient and a high overload capacity. Large oil ducts are provided throughout the coil.

CORE BUILDER ASSEMBLES LAMINATIONS THROUGH 500 KVA POLE STAR COIL

Core laminations are individually lapped. There are no gaps or butt joints in the Pole Star core to cancel out the advantages of the cold-reduced, oriented electrical steel. The lapped construction reduces the flux density at the joint and maintains the low reluctance path of the Pole Star core.

COMPANY

Product Of Long Experience
Safe, Thrifty And Reliable

The Perfect Combination . . .

WESTERN RED CEDAR POLES

LIFE-SPAN full length Immunization

Here truly is an unbeatable combination . . . Nature's most perfect poles treated the LIFE-SPAN way. Every Western Red Cedar Pole receives complete end-to-end treatment, first in a hot solution to drive out the air and prepare the wood cells for preservative absorption; next a sudden submersion under a cold pentachlorophenol solution which contracts the expanded air in the cells. This creates a vacuum sufficient to pull the solution deep into the sapwood. Pole protection is sealed for life, insuring dependable service up to pole line obsolescence.

Linemen like LIFE-SPAN poles because they are clean, easy to handle, and safe to work on. Utility companies like them because they offer dependable service and they build good public relations for the companies using them.

To be sure, to be doubly safe . . . specify LIFE-SPAN Western Red Cedar Poles.

The same LIFE-SPAN treatment is also available for Fir, Western Larch and Lodgepole Pine.

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MINNEAPOLIS, MINNESOTA

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SCHAEFER-HITCHCOCK CO.
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RUGGED

AMP's New Line of Power Terminals Are . . .

Built for Service!

It's Quick-It's Easy!
Jaws Snap Open!

AMP Trade-Mark
Reg. U. S. Pat. Off.

12 tons of pressure, yet only 12 pounds of weight makes AMP's new hand hydraulic tool your best bet for rugged, dependable installation of these AMP *precision-engineered* power terminals. Terminals and connectors are available in all ranges from #8 to #4/0. DESIGNED FOR USE ON ALL SHAPES OF WIRE: SOLID, STRANDED, SQUARE, OVAL, OR COMBINATIONS! Dies snap in and out easily. Tool automatically releases when crimping pressure is reached. Can be used with either pole strap or bench stand if desired. WRITE FOR SPECIAL POWER TERMINAL CATALOG.

AMP

AIRCRAFT-MARINE PRODUCTS INC.
POWER TERMINAL DIVISION
1200 Paxton Street, Harrisburg, Pa.

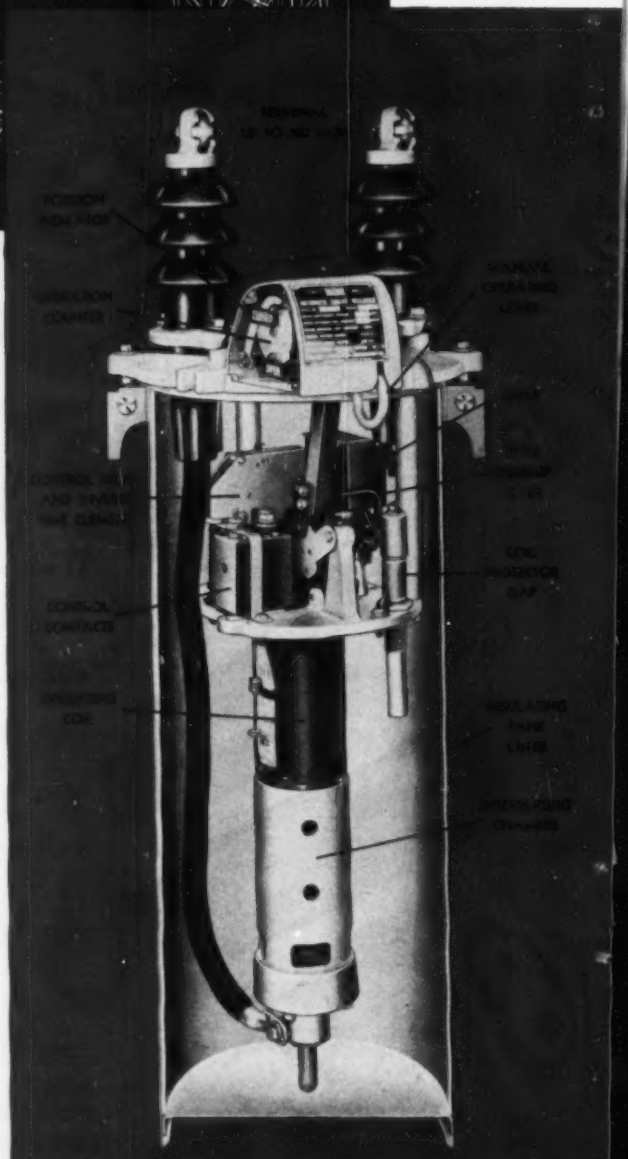
R&IE

POWER CLASS

Save Money—
with
ECONOMICAL PROTECTION

1. Reduces service costs by preventing unnecessary fuse blowing.
2. Provides full protection to wires and equipment.
3. Greater accuracy through mechanical timing.
4. Coordinates with primary and secondary fuses.
5. Permits normal fusing for selective clearing of overloads and short circuits.
6. Selects with substation overcurrent relays.

Read how "Reclosers Reduce Distribution Interruptions to Practical Minimum", Electrical World May 19, 1952



TYPE MB-1
(shown)

RECLOSERS up to 280 Amperes continuous duty

Bring you Transmission type service for your Distribution System — *Substations and Lines.*

Check the Facts —

1 High interrupting capacity - up to 6,000 amperes!

2 Load currents - 100, 140, 200 and 280 Amp.

3 Insulated Housing - can be grounded.

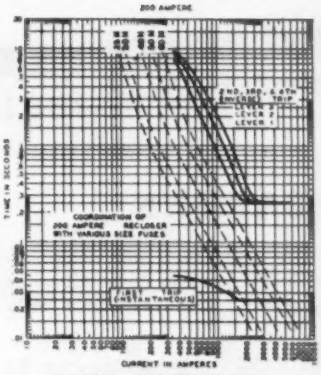
4 Improved fuse coordination - "lightning fast" (1½ cycle initial tripping) followed by -

5 Selective delayed subsequent tripping (adjustable inverse time, or adjustable definite time).

6 Quick reset from lockout. Trip-free reset lever.

7 Improved precision mechanical timer - free from temperature error.

8 Mechanism can be mounted in tank in any angular position in 60 degree steps.



High Fidelity TIME CURRENT CURVE

Ratings —

INTERRUPTING RATINGS IN RMS SYMMETRICAL AMPERES

The Recloser will also interrupt the maximum asymmetrical current on a distribution circuit for which the symmetrical fault current does not exceed these ratings.

Type MB-1			Type MBH	
Continuous Duty Rating of Recloser in Amperes	Service Voltage 2.4 Kv	Service Voltage 7.2 Kv	Continuous Duty Rating of Recloser in Amperes	Service Voltage 14.4 Kv.
100	4000 Amps.	4000 Amps.	100	2000
140	5000 "	4000 "	140	2000
200	6000 "	4000 "	200	2000
280	6000 "	4000 "	280	2000

More Information — *Complete Information is available.*

For details write:

R&IE EQUIPMENT DIVISION
I-T-E Circuit Breaker Co.
GREENSBURG, PENNA.

CONDUCTOR SUPPORTS: CLAMPS AND FITTING

DISCONNECTING SWITCHES INDOOR AND OUTDOOR

HORN GAP SWITCHES

INTERRUPTER SWITCHES

CUTOUTS AND THERMO-RUPTERS

DISTRIBUTION EQUIPMENT

SWITCH OPERATING MECHANISMS

SUBSTATIONS

OPEN OR ENCLOSED, ISOLATED PHASE - HEAVY DUTY BUSES

KIRK INTERLOCK SYSTEMS

AUTOMATIC RECLOSING EQUIPMENT

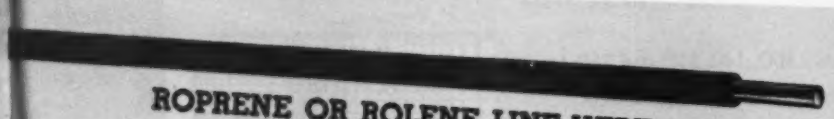
METAL CUBICLES

TESTING DEVICES

You get these advantages with

Rome Aluminum

ROPRENE SELF-SUPPORTING SERVICE DROP CABLE



ROPRENE OR ROLENE LINE WIRE

3 BIG REASONS

Why you are bound to save money with Rome Aluminum Self-Supporting Service Drop Cable and Rome Aluminum Line Wire . . . lower purchase cost . . . lower installation costs . . . longer service life.

LOWER PURCHASE COST . . . Depending upon the service involved, aluminum conductors cost less today.

LOWER INSTALLATION COSTS . . . Aluminum's lighter weight means easier and cheaper handling . . . in many instances permits longer spans with fewer poles. The simplicity of Rome's Self-Supporting Cable construction means increased savings through cheaper hardware and ease of installation.

LONGER SERVICE LIFE . . . Aluminum has proved itself as a long-life conductor material. RoPrene (Neoprene) as well as RoLene (polyethylene) as either insulation or covering has exceptional resistance to sunlight, moisture, corrosive atmospheres and abrasion. With no braids to rot and festoon, replacement is minimized.

Rome Aluminum Self-Supporting Service Drop Cable is regularly supplied with two RoPrene (Neoprene) insulated power conductors of solid aluminum, spiralled around a bare neutral messenger of ACSR (aluminum conductor steel reinforced). This time-proven construction provides high strength, plus simplicity of installation.

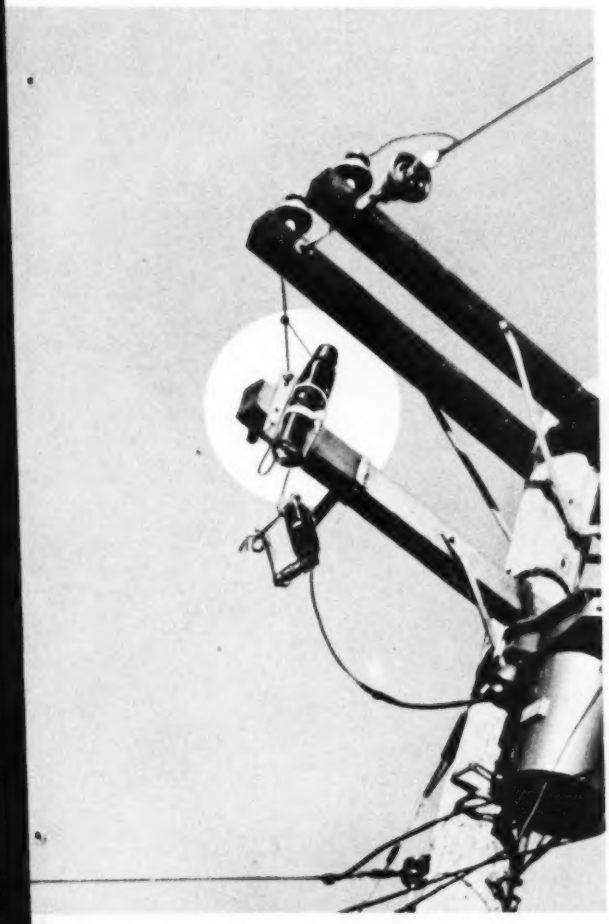
Rome Aluminum Line Wire is available with covering of RoPrene (Neoprene) or RoLene (polyethylene). Here is low cost Line Wire having ease of handling, as well as long, non-festooning service life. Uniformly small diameters provide neater appearance, besides reducing wind and ice loading.

It Costs Less to Buy the Best

Rome ALUMINUM

ROME CABLE CORPORATION, ROME, N.Y., AND TORRANCE, CALIF.

NEW EXPULSION ARRESTER OFFERS HIGHEST SHORT-CIRCUIT CAPACITY



The new Westinghouse LX Arrester is designed to provide the *reserve of protection* needed as a result of increased concentration of power at distribution centers. Combining the expulsion principle with positive current-limiting action, the arrester operates successfully at locations of very high-bolted fault current—20,000 amperes at 3 kv!

Gaps and terminals shielded for safety

The LX Arrester is not only efficient but also completely safe. The series gap and the ground terminal are shielded by porcelain. With the polyethylene terminal cover, protection from exposure to live parts is complete.

Another advantage for the lineman is the easy voltage identification . . . each ring on the main porcelain body indicates a rating of 3 kv.

UNUSUAL DESIGN PROVIDES EXTRA PERFORMANCE BENEFITS

A skillful design involving the use of a spiral grooved filler produces an arc path of considerable length which sparks over at very low value. There is no "IR" drop of the kind encountered in valve-type arresters . . . the arc drop is the only voltage that appears across the arrester during the flow of surge current.

Westinghouse representatives have the full story on the LX Arrester. Ask for complete details or write for Descriptive Bulletin 38-150 to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Penna.

YOU CAN BE SURE... IF IT'S Westinghouse

LIGHTNING ARRESTERS

Rigid testing proves quality of Westinghouse high-voltage arresters

Because lightning arresters are a vital part in the protection of costly station equipment, Westinghouse tests every arrester to assure greatest reliability. Extensive production-line tests (shown here) insure the adequate performance of Westinghouse SV & LVS Arresters under the most severe operating conditions.

The heart of the arrester, the Autovalve® block, undergoes four separate tests; durability, hot-lightning, volt-ampere characteristics, and 60-cycle sparkover. They prove the ability of the arrester to divert lightning, arrest power-follow current and protect equipment. Proper assembly is checked by the 60-cycle sparkover test—and finally, the complete arrester is moisture tested.

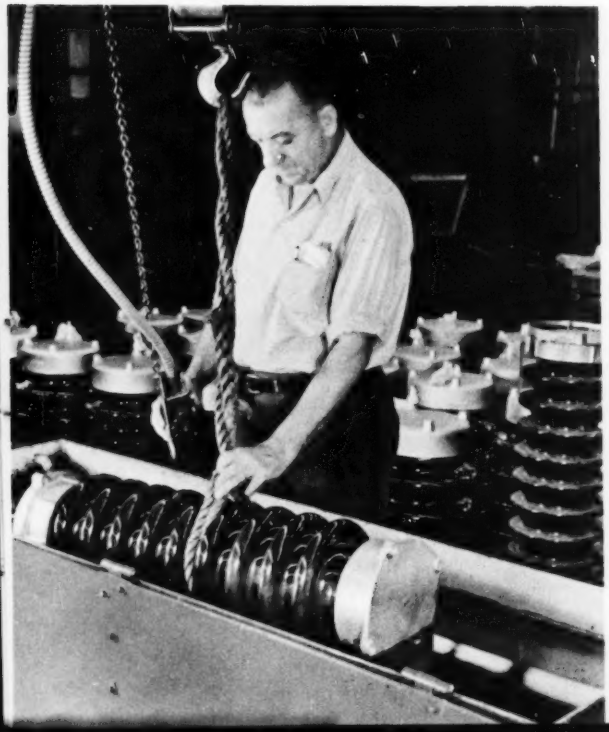
The excellent on-the-job service records of Westinghouse Arresters attest to this rigid method of quality control. It's another reason why you can be *sure* when you specify Westinghouse Arresters for any high-voltage application.

Durability test . . . A five percent sample of each batch of station arrester, Autovalve blocks receives at least fifty, 10,000-ampere long-tail discharges, superimposed on rated 60-cycle voltage, as a minimum quality requirement. If the 5% sample proves satisfactory, each block in the balance of the batch is . . .

Hot-lightning tested with two separate surges, superimposed on rated 60-cycle voltage, on a revolving test table as pictured above. For station-type blocks the current peak is 10,000 amperes. Line and distribution units get peak surge of 5,000 amperes. Series gaps are in the white rings above each cubicle.

Volt-ampere test assures that the "IR" drop of each Autovalve block is within the required limits. A 1500-ampere surge is used for this purpose. During the discharge, volt-ampere characteristics are observed on the screen of the cathode ray oscilloscope.

Sparkover test makes sure the 60-cycle breakdown and the internal assembly of every Westinghouse Autovalve Arrester are correct. It provides conclusive proof that the arrester will withstand its power voltage rating with considerable margin.



Moisture test . . . To assure that the complete arrester is absolutely moistureproof, each one is submerged in water and seal tested for leaks under 30 pounds per square inch of nitrogen gas pressure. Every arrester must pass this test without leakage. Westinghouse has conducted this test for 20 years.

YOU CAN BE SURE...IF IT'S

Westinghouse

LIGHTNING ARRESTERS

NOT ONE CASE OF MOISTURE TROUBLE REPORTED ON WESTINGHOUSE LV ARRESTERS IN 12 YEARS!

The excellent performance record of LV Arresters actually dates back to 1932, when Westinghouse introduced the "spun-on" metal cap. This feature licked the moisture problem permanently! So permanently, in fact, that it has not been necessary to alter this basic design in the past twenty years. The result; not one case of moisture trouble, radio interference or line lockout reported on the LV Arrester in 12 years!

Many other features contribute to the impressive service record of the LV Arrester. Its low, uniform sparkover—a result of pre-ionizing tips; its high surge capacity provided by preformed, pre-tested Autovalve blocks. Its protection against line lockout, assured by the drop-out feature.

Get Complete Information

For complete information on Westinghouse LV Arresters contact your Westinghouse distributor or Westinghouse representative. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-60786

YOU CAN BE SURE... IF IT'S
Westinghouse

LIGHTNING ARRESTERS

Aluminum Conductor for Distribution?

ARE PREFORMED ARMOR RODS *NEEDED*?

For protection against vibration, "Preformed Armor Rods" are *not necessary*, BUT they are *definitely needed* for:

1—Splicing

2—Dead-ending

3—Repairing

4—Conductor covering . . . to protect against arc-over, pitting, abrasion and corrosion.

5—Tapping . . . to prevent conductor corrosion, overheating and mechanical damage from concentrated stresses.

During the recent A.I.E.E. and E.E.I. Conventions in Cleveland, many distribution and transmission engineers visited our Factory and Laboratory to see for themselves why Preformed Armor Rods are the answer for connecting and supporting ALUMINUM CONDUCTORS.

For details of the PLP exclusive advantages, see your nearest PLP Representative or write or . . .

TELEPHONE CLEVELAND: EXpress 1-3571

PLP

PREFORMED LINE PRODUCTS COMPANY

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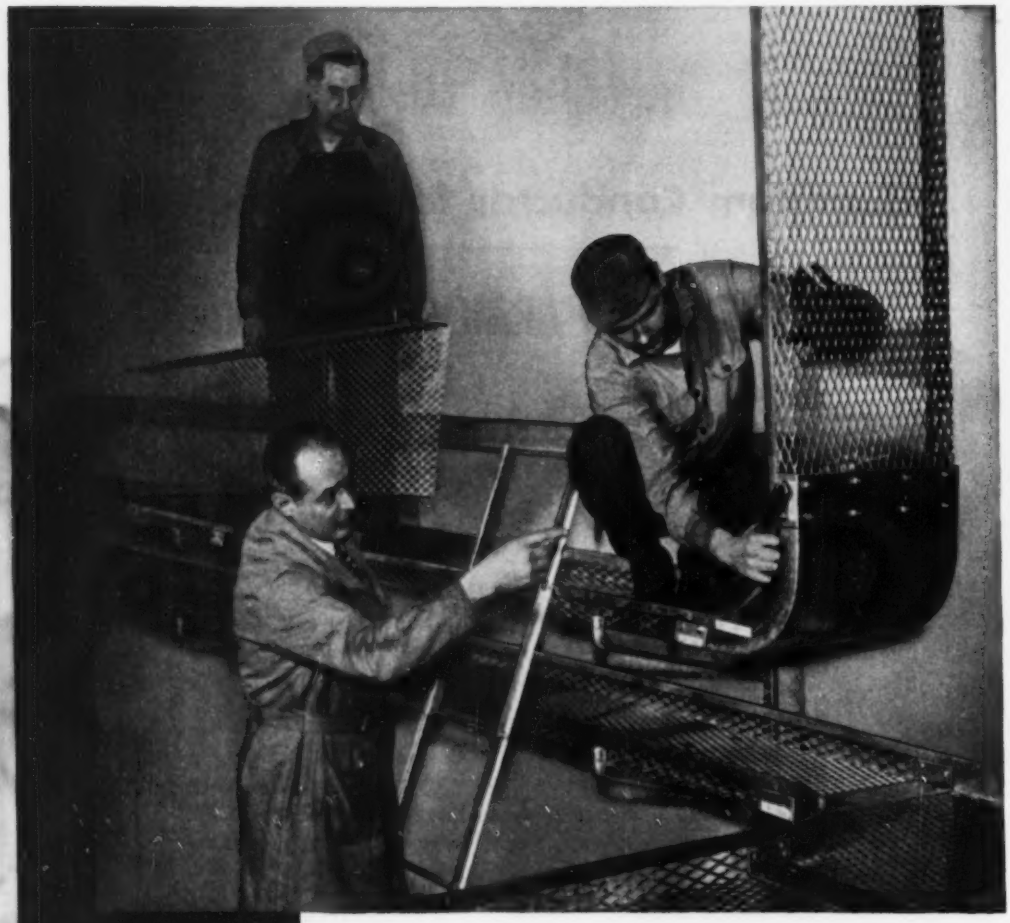

LIGHT

. . . . BUT STRONG!

COPE Cable Trough is both strong and light. These two important factors help to give you a simple and versatile standard system for supporting cable, which will save you in . . . material, man hours and costs.

Write today for full information on COPE Cable Trough.

You know Cope by these products

T. J. Cope INC.

711 South 50th St. Philadelphia 43, Pa.

All along the line!

P-L ANCHORS

. . . are Heavier— Stronger— Easier to Install

There is a P-L Anchor to meet your requirements for any size job . . . *all along the line* . . . from the smallest distribution lines to heavy power transmission lines. Available in six, eight and ten inch diameters with holding power classifications from 2500 pounds to 20,000 pounds. P-L Anchor superiority has been proved by use in over a million installations. All P-L Anchors are made of heavy-gauge, high-strength steel . . . are easy to install . . . give maximum holding power with minimum installation cost.

WRITE FOR DESCRIPTIVE LITERATURE

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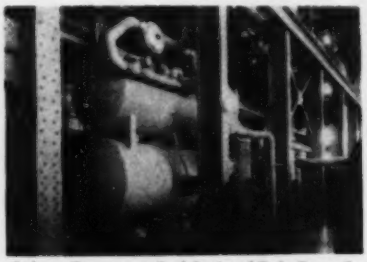
ORIGINATORS OF THE BINDING HINGE ANCHOR

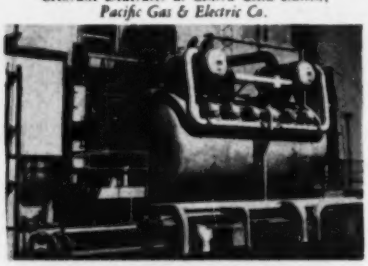
CONSULT *The* LEADER



Cochrane Deaerator at Buck Station of Duke Power Co.

COCHRANE has been serving the power-generating steam plants of the nation since the days of the earliest electric light and power stations. Pioneer in the development of the modern feedwater Deaerator, Cochrane leads in the design and construction of this vital link in the chain of power generation.

Cochrane Deaerator at Contra Costa Station, Pacific Gas & Electric Co.



COCHRANE CORPORATION • 3146 N. 17th St. • Philadelphia 32, Pa.

In Canada: Canadian General Electric Co., Ltd., Toronto—In Mexico: Babcock & Wilcox de Mexico S. A. Mexico City—In Europe: Recuperation Thermique & Epuration: Paris

COCHRANE

COCHRANE CORPORATION 89 YEARS OF SERVICE 1863 - 1952

Busy Buzz FROM A PENNSYLVANIA BEEHIVE!

NOT LONG AGO Pennsylvania Power & Light Co. buzzed with a commercial electric cooking promotion.

Results? Loads of them!

. . . Penn Power & Light Co. added an average of 2.1 KW of connected load for each of their 4,500 prospects, bringing in an extra annual revenue of $52.50 per prospect!

As a matter of fact, during the past 5 years alone, PP&L has added 45,000 KW of new commercial cooking load—including well over 10,000 KW in 1951. Cooking load added during this 5-year period is estimated to yield PP&L an additional revenue in excess of $1 million annually!

You, too, can get big commercial cooking returns like these.

Here at Hotpoint we have the programs ready that can and will show you how to get them . . . quickly and easily!

Won't you drop me a letter expressing your interest?

Just address it to: Orrin E. Wolf, Vice President, Hotpoint Inc. —Commercial Equipment Department—265 So. Seeley Ave., Chicago 12, Illinois.

Hotpoint

Hotpoint Inc., A General Electric Affiliate

FIRST IN COMMERCIAL COOKING
...the load builder to get a line on!

GREATEST ELECTRICAL INSULATION *News* SINCE FIBERGLAS

BH "1151"

FIBERGLAS *plus* SILICONE RUBBER

Meet BH "1151", a happy union of Silicone Rubber and Fiberglas for better, safer, longer electrical product operation.

After months of research and testing, BH "1151" Silicone Rubber Fiberglas Tubing and Sleeving is available to give you a truly superior electrical insulation.

BH "1151" is a Class H insulation of braided Fiberglas yarns with a coating of Silicone Rubber. It features remarkable high heat resistance combined with *permanent* flexibility. Suitable for continuous operation in a temperature range of –90° F. to 400° F., it will resist spot temperatures up to 600° F. It has average dielectric strength up to 7,000 volts, in rated grades, and exceptionally high electrical resistance.

BH "1151" meets all applicable NEMA specifications for Class H insulations. It offers absolute freedom in bending and handling without loss of rated dielectric strength. It will not crack or craze, maintains its protection in bent positions. Completely inorganic, it will not support fungus growth.

Made in colors for circuit tracing and coding, BH "1151" is available in continuous lengths for economy and convenience. It may be cut in short lengths and will not fray or ravel. Write for complete data and samples for production testing.

Address Dept. W-6
Bentley, Harris Manufacturing
Conshohocken, Pa.

BH *Fiberglas** **SLEEVINGS**

*BH Non-Fraying Fiberglas Sleevings are made by an exclusive Bentley, Harris process (U. S. Pat. No. 2393530). "Fiberglas" is Reg. TM of Owens-Corning Fiberglas Corp.

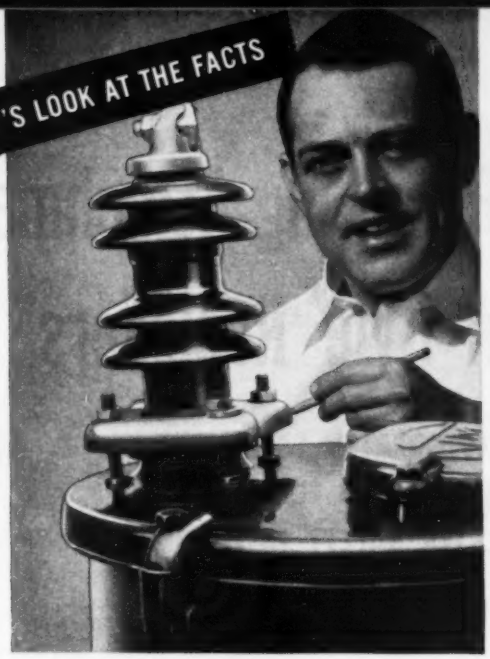


FIGURE 1. Cover bushings on an L-M Round-Wound 15 kva 7200 volt transformer. Note the generous width of skirting for high creepage distance, the four-bolt cover clamp that assures even pressure on gasket and porcelain.

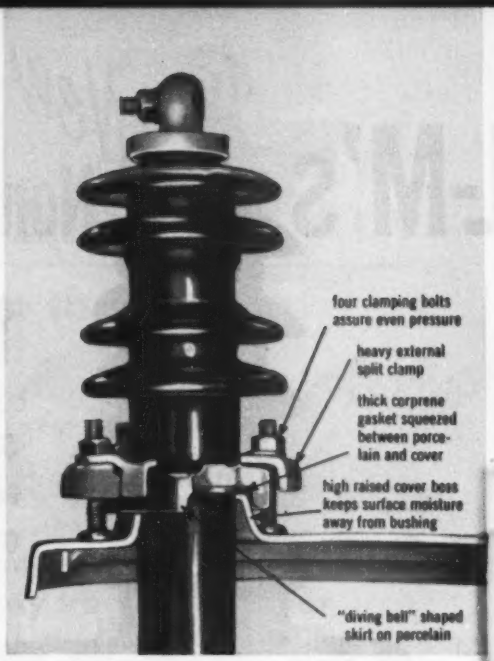

four clamping bolts assure even pressure
heavy external split clamp
thick corprene gasket squeezed between porcelain and cover
high raised cover boss keeps surface moisture away from bushing
"diving bell" shaped skirt on porcelain

FIGURE 2. Close-up of triple-seal against moisture. 1. Deep-skirted porcelain gives "diving bell" effect. 2. Thick corprene gasket, squeezed between porcelain and steel boss. 3. Deep-drawn cover boss keeps moisture away.

Cover Bushings on L-M Round-Wound Transformers Triple-Protected Against Moisture, Corona

"Diving Bell" design porcelain, thick corprene gasket, and high raised boss on cover provide triple barrier

By **ALVIN B. COYLE,**
Manager Transformer Sales
Line Material Company

In the design of cover bushings, L-M engineers have gone to great lengths to eliminate moisture entrance and corona, which would cause undesirable radio interference.

The porcelain itself is designed with exceptionally generous creepage distance and high wet-flashover characteristics. The best grades of electrical porcelain are used, with the surface fully glazed. At the bottom is an extra skirt or lip, which is curved downward to give a "diving bell" effect in keeping moisture away from the gasket.

The porcelain is mounted on an exceptionally high raised boss in the cover, which in itself leads moisture away from the bushing. Between the boss and the porcelain is a thick corprene gasket tightly squeezed by the four-bolt cover clamp. Corprene has the initial hermetic sealing property of synthetic rubber plus the elasticity and non-flowing characteristics of cork to maintain a permanent vapor-proof seal.

The result is a bushing that provides exceptional protection against moisture and breathing; it is corona-free and causes no radio interference.

Get Full Information

These cover bushings are standard equipment on all L-M Round-Wound transformers of 5000 volts and over. For more information on these and other features of these outstanding distribution transformers, ask the L-M Field Engineer; or write Mr. Coyle at the Transformer Division, Line Material Company, Zanesville, Ohio (a McGraw Electric Company Division).

"Round-Wound" is a Line Material Company trademark.

87R

LINE MATERIAL
Transformers
Complete Coordinated Equipment for Distribution Today

LM ORTO

L-M's *New* Non-Reclosing Attachment for Kyle® Reclosers

GIVES GREATER SAFETY FOR MEN AND EQUIPMENT... GREATER SAFETY IN HOT LINE WORK

L-M's new Non-Reclosing Attachment provides lockout of the recloser on the first fast operation. Should an accidental contact or arc occur while men are working on the line, the recloser opens instantly and stays open, instead of continuing through the usual complete four-operation sequence.

This new attachment provides the same protection out on the line that has been available only on substation breakers. It permits hot line work with far greater safety to men and equipment. The attachment is available at a small extra cost on all Kyle reclosers.

For complete information ask the L-M Field Engineer or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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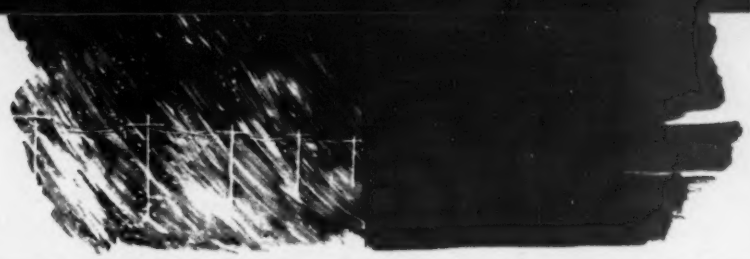
The Non-Reclosing Attachment lever is under the sleet hood next to the regular reset handle. Pulling down the lever puts the attachment into operation but *does not* open the line. When work is completed the lever is pushed back up—and the recloser will then operate normally.

LM®

LINE MATERIAL



From Northern Canada to the Tropics

Kyle OCR's are OK

They give you dependable operation in any kind of weather

▼ Ambient temperatures are no problem to Kyle® Oil Circuit Reclosers. They are as dependable at extremely low temperatures as at normal temperatures. Installation records show that thousands of Kyle reclosers are regularly operating at extreme temperatures all over the world.

Here's just one example: One of the large users of Kyle reclosers is a power company in Northern Canada. Here the long clear summer days get pretty hot. And on long winter nights the mercury may drop down to 50 below.

In winter, deep snowdrifts block roads for weeks at a time. A blown fuse could mean a long blackout. But with Kyle reclosers, there are a minimum of power interruptions. Performance is excellent the year around. Customers have less trouble, and Kyle reclosers don't seem to know whether it's hot or cold, judging by their unfailing, prompt, accurate operation.

Kyle reclosers lick weather problems. Eliminate service trips over ice and snowdrifts. Cut outages to a minimum. Save money on fuse link replacements. Assure accurate coordination. Ask the L-M Field Engineer for details on L-M—Kyle complete automatic protection. Or write for a copy of Bulletin CR1 to Line Material Co., Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Kyle oil-filled equipment is now supplied with ORTO®, L-M's oxidation resistant transformer oil, inhibited to lengthen oil life.

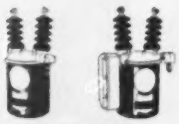
Kyle type H single-phase recloser, with all the Kyle safety features. Seven operating sequences.

Kyle type 3H — operates individually on each phase but locks out all three phases simultaneously.

Kyle type L Heavy Duty—only recloser with 4 operating curves; interrupts up to 6000 amperes.

Kyle type E recloser, with all the Kyle features. It is engineered especially for 23 kv systems.

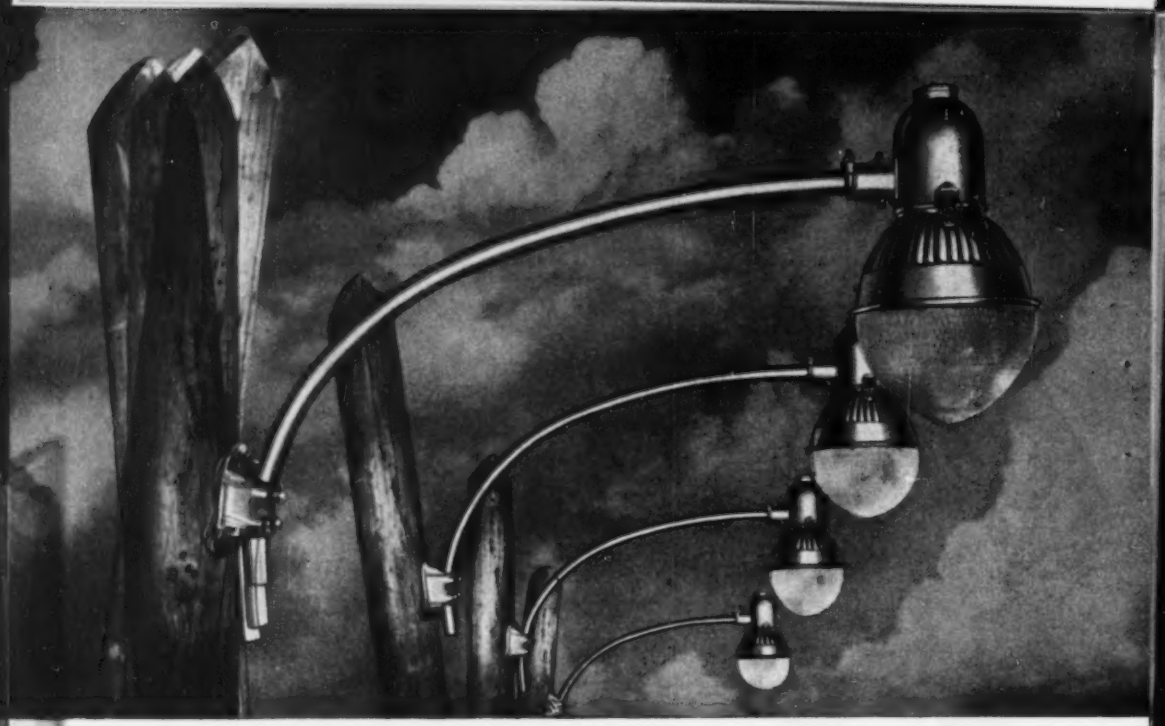
Kyle type GS sectionalizer makes protection completely automatic—coordinates with all reclosers.



Kyle oil switches for many applications. Manually operated type G, or remote control type GR (right) for capacitor and other remote control switching.

LM

LINE MATERIAL... Kyle Reclosers



Luminaires Easier to Align With L-M's New Adjustable Bracket

Features integral plumbing for wide ranges of pole rake . . . clean, modern lines . . . easy installation and wiring . . . minimum pole-space requirement.

Really rigid: **the pole plate is a sturdy casting, either steel or aluminum, rigidly held to the pole with a machine bolt at the top and two lag screws below. Two U-bolts grip the bracket firmly. It requires a minimum of pole space.**

Here is a new single curve upsweep bracket that makes it easy for you to plumb the luminaire. The bracket has pleasing, functional design; it is made in either steel or aluminum; it is easy to install and wire; and it is available with all conventional end-fittings.

Easy to adjust: the curved pipe is clamped into the pole plate with two U-bolts. By moving the pipe up or down, you change the angle to compensate for almost any degree of pole rake. Then you tighten the U-bolts, and the bracket remains rigid in the desired position.

Easy to install: the pre-wired assembly is attached to the pole by means of an open-slotted pole plate, which fits over a single machine bolt at the top. The entire weight of the assembly is firmly held this way, while you install two lag screws at the bottom of the pole plate. This mounting requires a minimum of pole space.

Easy to wire: the one piece bracket is a single curve, with smooth contour. There are no sharp bends or extra units through which the wiring must be guided. You just slide the wire right through—it saves time and helps assure a good job. Ask the L-M Field Engineer for full information, or write Line Material Co., Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LM **LINE MATERIAL** *Street Lighting*

84

For every part of town...

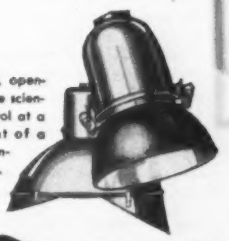
L-M LUMINAIRES

make cities brighter, safer

L-M Ovalite—Mercury Vapor Unit. Newly developed optical system assures effective light utilization and good distribution on the street. Mercury vapor lamp is in horizontal position, high up in the reflector to minimize glare. Takes 11,000, 15,000 or 20,000 lumen lamp. Optional magnetic arc control feature keeps arc centered.

L-M Spherolite This famous L-M unit is widely known for its high efficiency, versatility, and many other desirable features. Takes up to 20,000 lumen mercury vapor or 10,000 lumen incandescent lamps.

L-M Spherolite Jr. For better neighborhood lighting at an economical neighborhood price. Interchangeable with Spherolite metal or porcelain heads, permitting low cost installation of the Junior and economical replacement later with the larger luminaire if traffic growth warrants. Has many of the Spherolite features, offers many light distribution patterns.



L-M Directolites Efficient, open-type luminaires that provide scientifically designed light control at a cost little more than that of a radial bowl. Available in symmetric or asymmetric types.

● L-M provides complete street lighting equipment for all sizes of communities and all kinds of neighborhoods. There are incandescent or mercury vapor units for white way lighting. There are smaller units for residential and outlying sections. A wide variety of reflectors, deflectors and glassware provides complete control for every recommended IES light distribution pattern.

Also available are standards, brackets and mast arms, transformers, control and service equipment.

L-M street lighting engineers have years of experience and L-M's engineering service can provide the answer to your street lighting application problem.

WHICH OF THESE BULLETINS DO YOU WANT?

- ☐ Spherolite
- ☐ Spherolite Jr.
- ☐ Directolite
- ☐ Controlite®
- ☐ Mercury Vapor Lighting Units
- ☐ Street Lighting Standards
- ☐ Brackets, Mast Arms, Accessories
- ☐ Control Equipment
- ☐ Protective Lighting for industrial plants

Ask the L-M Field Engineer for the information you want, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

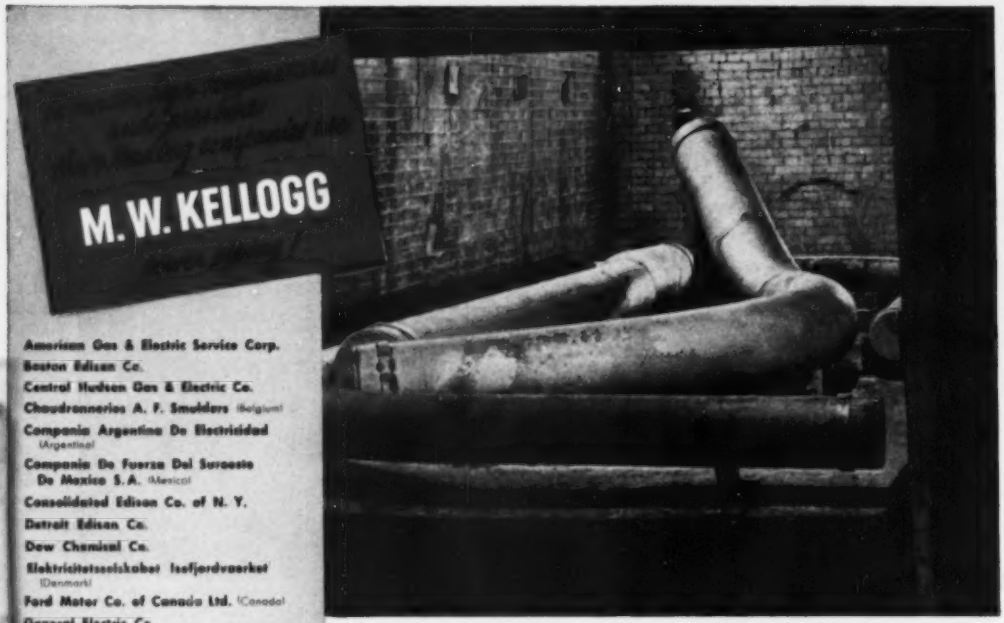
65R

Ovalite, Spherolite, and Directolite are trademarks

LM

LINE MATERIAL

Street Lighting



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Boston Edison Co.
Central Hudson Gas & Electric Co.
Chaudronneries A. F. Smulders (Belgium)
Compania Argentina De Electricidad (Argentina)
Compania De Fuerza Del Suroeste De Mexico S.A. (Mexico)
Consolidated Edison Co. of N. Y.
Detroit Edison Co.
Dow Chemical Co.
Elektricitetsselskabet Isefjordvaerket (Denmark)
Ford Motor Co. of Canada Ltd. (Canada)
General Electric Co.
Hartford Electric Light Co.
Houilleres Du Bassin De Lorraine (France)
Houilleres Du Bassin Du Nord Et Du Pas-De-Calais (France)
Hydro-Electric Power Commission of Ontario (Canada)
Indiana & Michigan Electric Co.
Interbrabant (Belgium)
Long Island Lighting Co.
Metropolitan Edison Co.
Mexican Light & Power Co. (Mexico)
Monongahela Power Co.
New York State Electric & Gas Corp.
Niagara Mohawk Power Corp.
Palestine Electric Corp., Ltd. (Israel)
Philadelphia Electric Co.
Public Service Co. of Northern Illinois
Public Service Electric & Gas Co. of N. J.
Societe Anonyme John Cockerill (Belgium)
Societa Edison (Italy)
Societe Financiere De Transports Et D'Entreprises Industrielles (Sofina) (Belgium)
Societa Meridionale Di Elettricita (Italy)
Sociedad De Electricidad De Rosario (Argentina)
Union D'Electricite (France)
United Illuminating Co.
Westinghouse Electric Corp.
West Penn Power Co.
Wisconsin Public Service Corp.

KELLOGG

What happens to power piping here is vitally important . . . *because*—

The necessity for heat treating high-temperature, high-pressure alloy power piping, after both bending and welding, is an accepted fact. But it is the *means employed* that determine the ultimate quality of the material.

Take *this* piping scheduled for one of the larger U. S. utility plants. It has been fabricated into sub-sections by experienced Kellogg benders and welders . . . men who have produced the critical piping for power stations putting out *more than six and a quarter million KW's.*

But all this skill *can* be wasted in the furnace during heat-treating, if specific procedures are not meticulously followed. In the first such treating step, ferritic piping is *normalized* or full-annealed to homogenize the grain structure, after it has been hot bent to the desired shapes.

Normalized piping must then be *tempered*—by reheating and subsequent cooling through a carefully controlled cycle. This eliminates undesirable hardness caused by the formation of martensite during the rapid cooling while normalizing.

When normalized and tempered piping has been welded, it must again enter the furnace for *stress relieving* of the weld areas. During this operation, any substantial variation from specified temperatures may produce differences in hardness between the weld areas and surrounding metal—greatly increasing the possibility of operating failures.

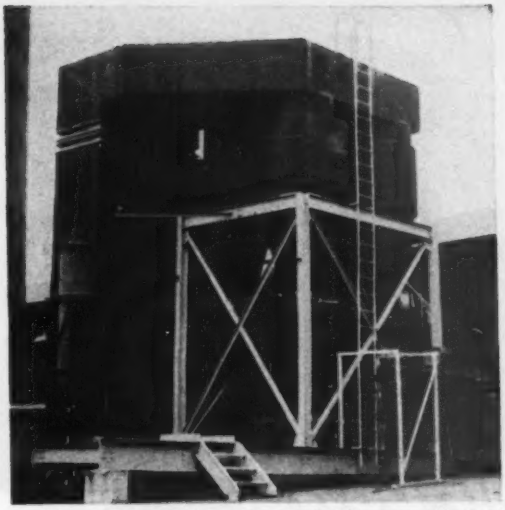
To assure that utility piping is free of such potential problems, Kellogg's Metallurgical Lab sets heat treating procedures for each assembly . . . and to guarantee adherence to those procedures Kellogg furnaces are extensively instrumented. Laboratory supervision of shop practices such as these is one of the *means* that guarantee quality when you specify Kellogg power piping.

OTHER FABRICATED PRODUCTS including:
Pressure Vessels . . . Vacuum Vessels . . . Fractionating Columns . . . Drums and Shells . . . Heat Exchangers . . . Process Piping . . . Heads and Headers . . . Forged and Welded Fittings . . . Radial Brick Chimneys

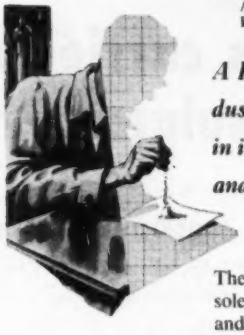
for 51 years an integral part of industrial progress!

The M. W. Kellogg Company (A Subsidiary of Pullman Incorporated)
New York, Jersey City, Buffalo, Los Angeles, Tulsa, Houston, Toronto, London and Paris.

Fly-ash collection can pay its own way



After an exhaustive study, engineers at a Southern paper mill selected Buell van Tongeren Cyclones for their three pulverized-coal-fired boilers.



A Buell industrial 'dust' man can show you how dust collection pays off in improved product, higher employee morale and better community relations

The Buell organization of industrial 'dust' men is devoted solely to the design and construction of dust recovery and dust collection equipment that will most efficiently and economically solve your plant's specific stack dust problem.

For more than 18 years we have been doing just this for all American industry. Every Buell installation is a custom designed system, engineered to hold stack dust discharge down to the practical limits which assure new profits, improved product and/or process, better plant-community relations, higher levels of employee morale.

For full information about Buell's **3 *basic systems*** of dust collection, and how one can be applied to the solution of your stack dust problems, write today. Ask for the new informative bulletin titled, "The Collection and Recovery of Industrial Dusts." Do it now. Buell Engineering Co., Dept. 60-F, 70 Pine Street, New York 5, N. Y.

ELECTRIC CYCLONIC

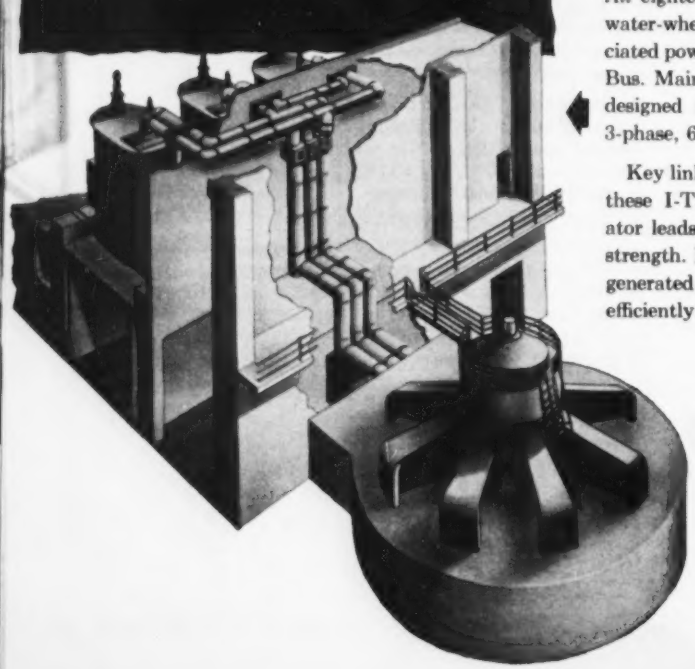
HIGH EFFICIENCY CYCLONES • ELECTRIC PRECIPITATORS
TYPE 'LR' COLLECTORS • LOW DRAFT LOSS COLLECTORS
SPECIAL PURPOSE COLLECTORS • DUST HOPPER VALVES

buell

ENGINEERED EFFICIENCY IN DUST COLLECTION

All power generated at Grand Coulee

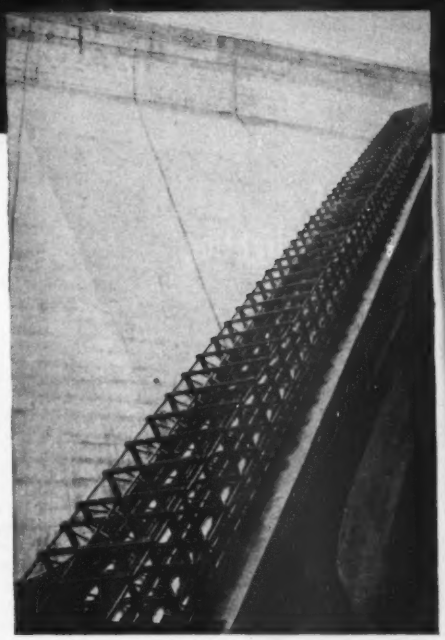
is carried by I-T-E Isolated Phase Bus

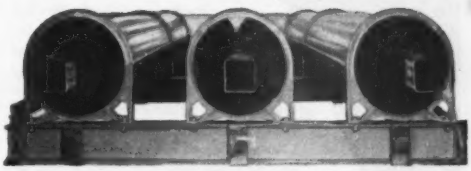


EIGHTEEN SETS OF GENERATOR LEADS

All eighteen of Grand Coulee's giant 108,000-kw water-wheel generators are connected to their associated power transformers by I-T-E Isolated Phase Bus. Main buses are rated at 5,000 amperes and designed for an operating voltage of 13.8-kv, 3-phase, 60-cycle—with one conductor per phase.

Key links in this huge power-generation system, these I-T-E air-insulated, metal-enclosed generator leads possess high dielectric and mechanical strength. Bus is built to carry the heavy currents generated by these eighteen power giants, safely—efficiently—dependably.





SIX PUMP BUS RUNS

The Grand Coulee pumping station will ultimately house 12 giant pumping units, each powered by a 65,000-hp, 200-rpm, 13.6-kv, 3-phase, 60-cycle synchronous motor. *Six pumps are now in service. Six others are planned for future installation.*

Power for this pumping service is supplied by three of the main generators, each generator feeding *two* pump motors. The three I-T-E Isolated Phase Bus runs now installed carry power—4300 amperes in each circuit—260 feet up the face of the dam. Six branch buses, rated at 2150 amperes each, connect the pump motors.

This I-T-E bus connection—comprising *9000* single-phase feet—is the longest structure of its kind in the world.

DESIGNED FOR MAXIMUM SERVICE CONTINUITY

Principal feature of these I-T-E bus runs is unique *isolated phase* construction. Each conductor is encased in an *individual* non-magnetic housing. Each housing is separated from adjacent housings by an insulating air space. *Phase-to-phase short circuits are virtually eliminated!*

MORE THAN 30 CONDUCTOR-MILES IN 277 INSTALLATIONS

I-T-E Isolated Phase Bus has been transmitting power from the world's largest generators since 1936—providing power plants with safe, dependable service.

I-T-E

ISOLATED PHASE BUS

I-T-E CIRCUIT BREAKER CO. · 19th AND HAMILTON STS., PHILA. 30, PA.

CANADIAN MFG. AND SALES: EASTERN POWER DEVICES, LTD., TORONTO · EXPORT SALES: PHILIPS EXPORT CORP., N.Y., N.Y.

miller luminaires

— the soundest investment of lighting dollars

Miller Portland Luminaire

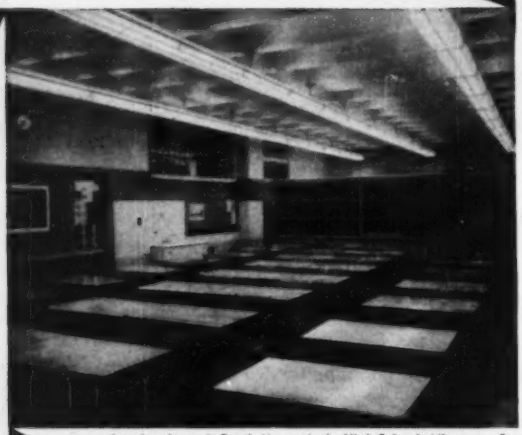
miller

leaders in lighting

since 1844

factories
offices
schools
stores
public buildings

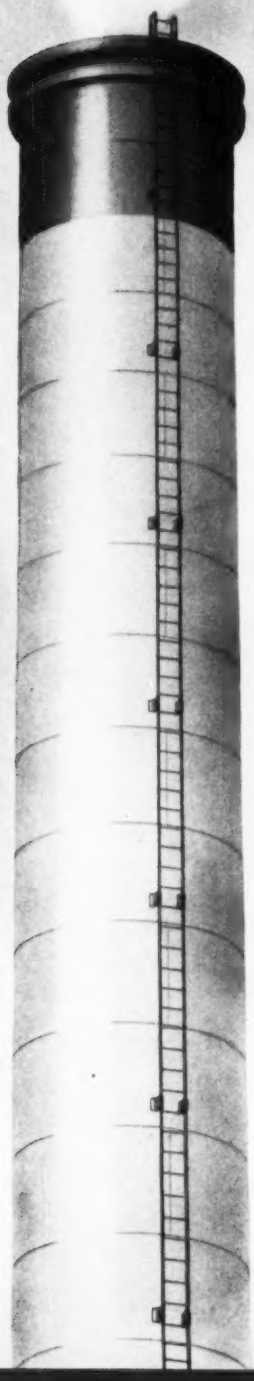
The advantages Miller Luminaires offer are many—first they are built to provide good light for easy seeing, for best work and avoidance of errors and accidents...Easy installation ...Low maintenance...Long, trouble-free service. For 108 years Miller has pioneered in GOOD LIGHTING with a complete line of luminaires—Fluorescent, Incandescent and Mercury for industrial and commercial lighting requirements. They have been proven in thousands of installations. Light with confidence the proven Miller way. Don't compromise on lighting that is "almost" right. When you buy, or specify, Miller luminaires, you are sure of getting all you seek—lighting equipment built on an exacting 8-Point QUALITY standard—the product of advance illumination engineering—the soundest investment of your lighting dollars. Miller field engineers and distributors are conveniently located for nation-wide service.



Interior shown is South Mountain Jr. High School, Allentown, Pa.
Architects; Heyl, Bond and Miller, Allentown, Pa.
Consulting Engineers; Eggly—Furlow, Philadelphia, Pa.
Electrical Contractor; Howard P. Foley Co., Allentown, Pa.

THE miller COMPANY MERIDEN, CONN
SINCE 1844

American Blower . . . a time-honored name in air handling



Proved procedure for minimizing a nuisance

Important power plants all over the country have found this procedure helpful in solving their fly-ash problems. You will, too. Here's all you have to do:

1. Contact your nearest American Blower or Canadian Sirocco Branch Office. They are conveniently located throughout the United States and Canada.
2. Our competent engineers will show you (or your engineering counsel) the advantages of installing Type ST Fly Ash Precipitators to meet your specific needs.
3. Your precipitators will be completely assembled at the factory, then partially disassembled into convenient sections and shipped to your plant for installation.

PRIMARY CONCENTRATOR
BREECHING FROM BOILER OR AIR HEATER
BREECHING TO INDUCED DRAFT FAN
SECONDARY VENT FAN
SECONDARY SEPARATOR DISCHARGES THE FLY ASH TO AN AIR TIGHT RECEPTACLE OR SEALED ASH DISPOSAL SYSTEM

AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT 32, MICH.
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONT.
Division of American Radiator & Standard Sanitary Corporation

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • ACME CABINETS • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

American Blower Type H Heavy Duty Steam Coil and component parts. The entire heating element is removable from the casing and can be completely dismantled for inspection, maintenance and repair. Individual tubes are replaceable.

Memo to Power Plant Men —

American Blower Heavy Duty Steam Coils were developed for you for the sole purpose of providing a heating coil possessing great strength... corrosion resistance... ease of maintenance, and complete accessibility.

For heavy loads at high pressures, investigate them now!

AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary corporation

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • ACME CABINETS • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

CHEVROLET Advance-Design TRUCKS

Buy on these plain, hard FACTS!

CHEVROLET first in demand in value in sales

Fact No. 1

COSTS LESS TO BUY

Payload pound for payload pound, a Chevrolet truck *lists for less* than any other truck with the qualifications to handle your job. As the world's largest manufacturer of trucks, Chevrolet takes advantage of production economies to pass substantial savings on to you!

Fact No. 2

SAVES MONEY ON THE JOB

Chevrolet trucks save you money over the miles with great proved features that cut costs. Valve-in-Head economy, rugged Hypoid rear axles, extra-sturdy channel-type frames and Flexi-Mounted cabs, Ball-Gear Steering, Synchro-Mesh Transmission.

Fact No. 3

RIGHT TRUCK FOR EVERY LOAD

Your first interest in a truck is: "How well will it do the job?" That's where Chevrolet trucks have it, because they're factory-matched to the payload—tires, axles, frame, springs, engine, transmission, brakes. You get as much truck as your job calls for.

Fact No. 4

KEEPS ITS VALUE LONGER

Chevrolet trucks traditionally keep their value longer to bring higher used truck prices, year after year, at trade-in time. That means real, substantial dollar-and-cents savings when you wish to replace your present truck with a new one.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

Here's Proof of Performance...

CREOSOTE OIL has kept these poles standing since 1904

TWICE a day for 48 years this string of poles on the Rockaway Beach Division of the Long Island Railroad has been subjected to alternate wetting and drying by tides in Jamaica Bay. These poles are a powerful testimonial to the effectiveness of Creosote Oil as a wood preservative.

Of the original 264 pressure-treated poles protected with Creosote Oil at the time of their installation in 1904, more than 80% are still standing and serviceable. And many of those removed were victims of fire and hurricane.

The poles were used to carry 11,000-volt power transmission lines and a 2,200-volt signal power line, before abandonment of the rail line.

Creosote Oil has countless performance records like this. They are the primary reason why the wood preserving industry used more than 200 million gallons of Creosote Oil preservatives in 1950, the last year for which statistics are available.

Creosote Oil contains not one, but many compounds whose toxicity and permanence ward off attack by such wood destroyers as termites, fungi, dry rot and marine borers.

When you use treated wood, be sure it is pressure-treated with uniform U·S·S Creosote Oil. It's the product of continuous processing in the world's largest tar distillation plant. For complete information, write United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

U·S·S CREOSOTE OIL

USS

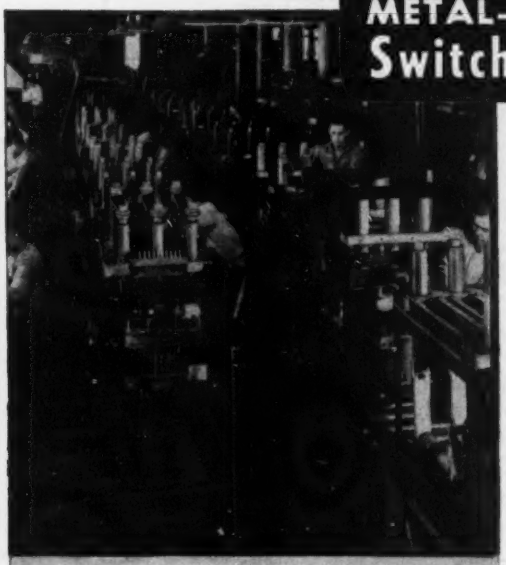
UNITED STATES STEEL

★ EVERY CIRCUIT BREAKER
★ EVERY STATIONARY ELEMENT

...Built to Master Jigs!

Perfect alignment of all parts is assured by jigs. Master jig of removable element is shown inside stationary element. Operation of elevating mechanism also checked with this same jig.

ALLIS-CHALMERS METAL-CLAD Switchgear



A number of jigs are used in building the removable elements. Two are shown in circuit breaker assembly line. This care during manufacture pays off in ease of installation.

For Fast, Easy Installation... Interchangeability Between Units of Same Rating

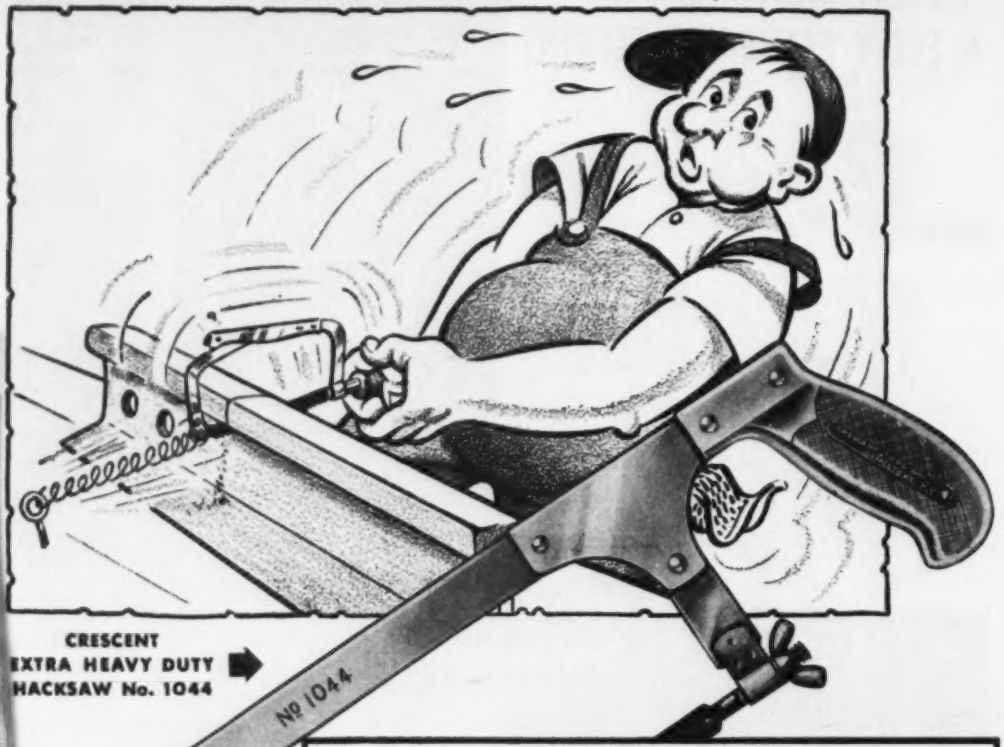
THIS IS JUST one example of the care taken in manufacturing Allis-Chalmers switchgear. Every step in building, every detail of construction, receives this same careful attention. It will pay you to find out more about Allis-Chalmers switchgear. Call your nearby Allis-Chalmers District Office for complete information, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3730

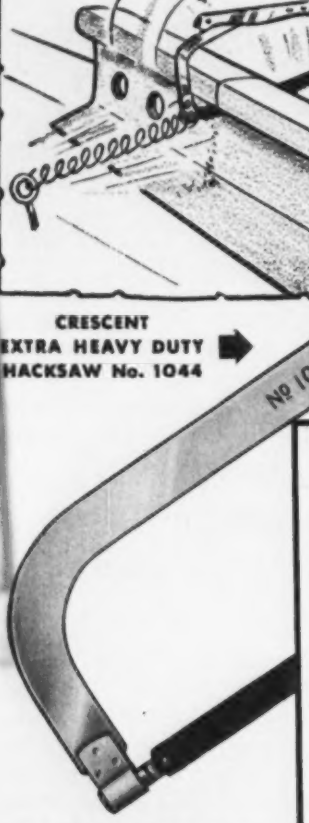
ALLIS-CHALMERS

First in the U. S. with Metal-Clad Switchgear

WHY DO IT THE HARD WAY? . . . . by BUSTER



CRESCENT
EXTRA HEAVY DUTY
HACKSAW No. 1044



There's a CRESCENT HACKSAW for EVERY JOB

Never send a boy to do a man's work . . . as Buster will shortly learn when that light-duty hacksaw finally collapses. Having recognized this simple truth many, many years ago, Crescent makes seven different Hacksaw Frames for varying types of service. Your Hardware Dealer or Industrial Distributor will help you select the proper type for *your* job.

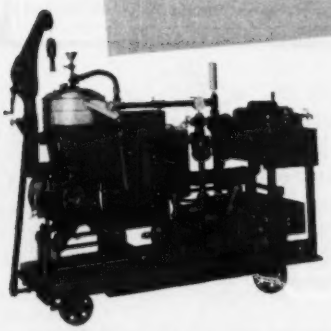
FREE BOOK!
Has all the answers. It tells what tools to use and how to use them. Fully illustrated. A postcard will bring it to you. Send today.

CRESCENT TOOLS
Give Wings to Work
®
Sign of the Artisan
Symbol of Excellence

Crescent is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by
CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

8 ADVANTAGES OF DE LAVAL INSULATING OIL PURIFIERS

Constant high purifying efficiency—no shut-downs for cleaning or for renewal of parts during run	Safest—continuous discharge of water prevents re-contamination of the insulating oil
Dehydrates at a single pass—no re-running	Centrifugal purifier economical to operate
Higher daily capacity of purifier saves maintenance costs	Removes free water without aid of filter press; press used only to remove colloidal carbon
Heater cannot carbonize the insulating oil	Low temperature purification; high dielectric value of oil maintained longer



THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

The eight reasons for preferring De Laval Insulating Oil Purifiers all total to one major advantage — ***safety***. De Laval Oil Purifiers provide the most ***reliable*** means ever devised for reconditioning transformer oil. When centrifugal force throws out the water and discharges it to waste, all danger of this water recontaminating the oil is obviously eliminated.

A De Laval Insulating Oil Purifier is so simple to operate that it saves supervision costs and makes possible maximum output of thoroughly dehydrated oil.

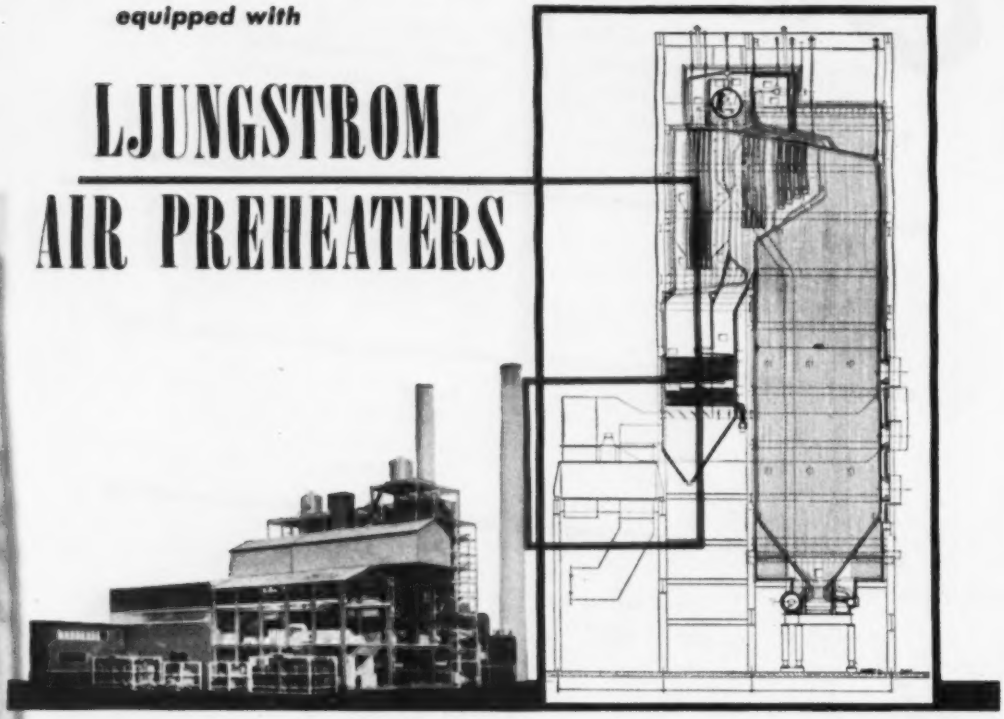
DE LAVAL

INSULATING OIL PURIFIERS

Boilers at new Gadsby Steam Plant of the Utah Power & Light Company . . . .

equipped with

LJUNGSTROM AIR PREHEATERS



Utah Power & Light Company's new Gadsby Steam Plant, designed by Bechtel Corporation, will utilize, on completion, two Riley Steam Generating Units totalling 1,195,000 pounds of steam per hour capacity.

One unit, shown here, went on the line last August. Fired with petroleum pitch and designed for future pulverized coal firing, it generates 620,000 pounds of steam per hour at 1500 psi and 955 F. The second boiler is scheduled to begin operation late this year. Its capacity will be 575,000 pounds of steam per hour. This unit is designed for 1700 psi and 1000 F, with a reheat cycle at 396 psi and 1000 F. It will be fired with pulverized coal, and will have firing equipment for petroleum pitch.

Each of these modern steam generating units has been designed to incorporate a Ljungstrom Air Preheater. The Ljungstrom now in service preheats combustion air to 642 F, cools stack gases to 305 F. The Ljungstrom on the second unit will preheat air to 650 F, cool exit gas to 315 F.

This is another example of the unanimity with which boiler manufacturers have included Ljungstrom Air Preheaters in outstanding recent installations. The effectiveness and dependability of the Ljungstrom Air Preheater have made it a standard for high efficiency steam generating units.

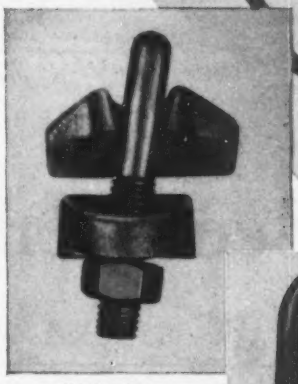
THE Air Preheater Corporation 60 East 42nd St., New York 17, N. Y.

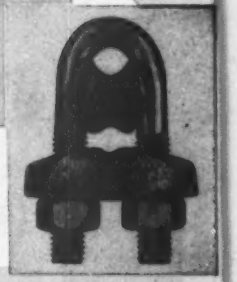
Dependable

MIF GUY CLAMPS

Never let a guy down!

- **GREATER HOLDING POWER**
  Clamping force increases as load increases. "Come-along" type grip minimizes human element in installation.
- **GREATER EASE OF INSTALLATION**
  Can be placed on strand in a matter of seconds. Holds strand in proper position while nuts are being tightened.
- **GREATER FLEXIBILITY**
  Each size accommodates a wide range of strand diameters. Substantial savings in handling and inventory.
- **GREATER ECONOMY**
  Low weight and cost per unit of holding power.





PAX67 Clamp rated 12,500 lbs. Note relative position of parts during tilting. Separating Block and Clamping Plate remain parallel at all times.

PAX64C accommodates ⅜"-⅝" dia. strands.

MIF UNIVERSAL CLAMPS

This series of clamps offers same unusual performance characteristics with added advantage of equal clamping surfaces on both wires. Particularly recommended on conductors or for general use where system standardization is desired.

SPECIFICATIONS

Cat. No.	# Rating lbs.	Strand Dia. Range	Wgt. Per C Pcs.
PAX64	7,500	⅜"-⅝"	85 lbs.
*PAX67	12,500	¼"-½"	122 lbs.
*PAX64C	7,500	⅜"-⅝"	67 lbs.
PAX67C	12,500	¼"-½"	143 lbs.

* Illustrated

#PAX64 & PAX64C Based on tests with nuts tightened to 45 ft./lbs.
PAX67 & PAX67C Based on tests with nuts tightened to 85 ft./lbs.

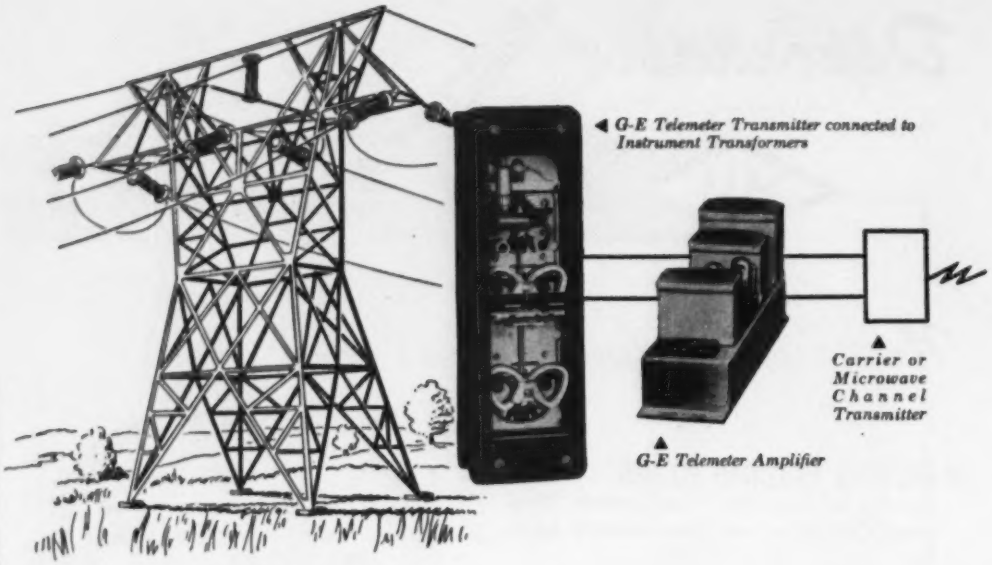
MALLEABLE IRON FITTINGS CO.

Pole Hardware Division Branford, Connecticut

N. Y. Office: 30 Church St.
Canadian Mfr. & Dist.: LINE & CABLE ACCESSORIES, Ltd. TORONTO

MIF

Representatives: William J. Cottrell Co., Portland, Ore. • James H. Drew Corp., Indianapolis, Ind. • Industrial Engr. & Equip. Corp., Los Angeles, Cal. • JSG Electric Co., Chicago, Ill. • S. H. McCoin, Knoxville, Tenn. • E. A. Thornwell, Inc., Atlanta, Georgia • J. F. Voight, Summerville, S. C. • Waltham, DeWitt & Kruse, San Francisco, Calif. • L. G. Wendegats, Kansas City, Mo. • Williams Sales Co., Fort Myers, Fla. • Williamson Sales Co., Shreveport, La. • O. C. Wilts Co., Detroit, Mich.


G-E Telemeter Transmitter connected to Instrument Transformers
Carrier or Microwave Channel Transmitter
G-E Telemeter Amplifier

See every load change

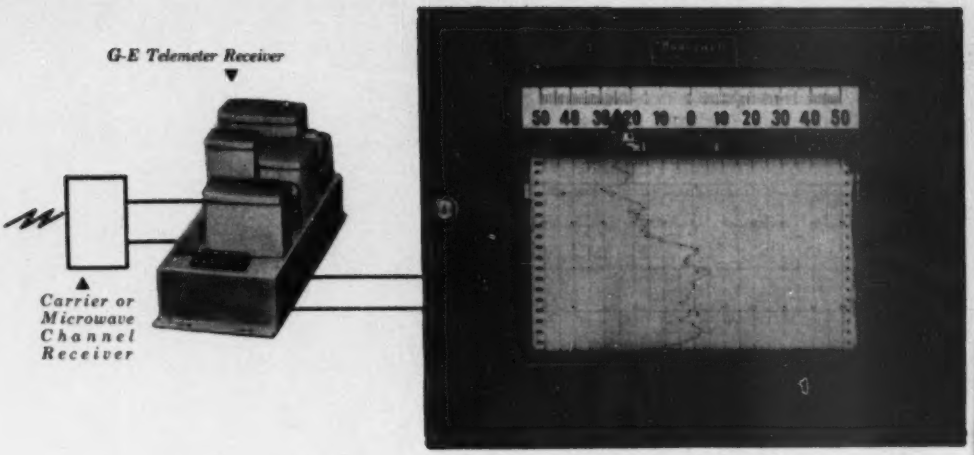
Flexibility... Dependability... for all power plant measurements

The versatile *ElectroniK* Recorder is applicable to measurement of pressure, flow, speed, pH, conductivity, power, current, temperature . . . the *same basic instrument for all*, with changes only in measuring circuit and sensing elements. Use of standard, interchangeable components simplifies maintenance, reduces parts-stocking problems. Single-point and multi-point models are available in a choice of printing speeds, and with chart speeds from ½" to 120" per hour.

The utmost in dependability demanded by power plant applications is insured by *ElectroniK* components . . . life-tested, service-proved, designed for minimum, easy maintenance. These rugged "building blocks"—the high-torque balancing motor, the hermetically sealed converter, the simplified continuous-balance amplifier—typify construction that minimizes the number of moving parts, and that eliminates troubles from dust and atmospheric humidity.

● *Important Reference Data*

Write for Instrumentation Data Sheet No. 9.1-10, "Long Distance Transmission of System Variables"...and for



ElectroniK Recorder

General Electric frequency-type telemetering system with ElectroniK strip-chart recorder

the instant it happens...

through continuous telemetering with ElectroniK RECORDERS

THE ultra-fast telemetering equipment shown above keeps the load dispatcher in constant touch with all parts of the system. It tells him every change in tie line interchange, in station generation and in system load—the instant that a change takes place. Operating over carrier current or microwave channels, it spans distances of hundreds of miles . . . eliminates the delays and uncertainties of intermittent, non-continuous measurement.

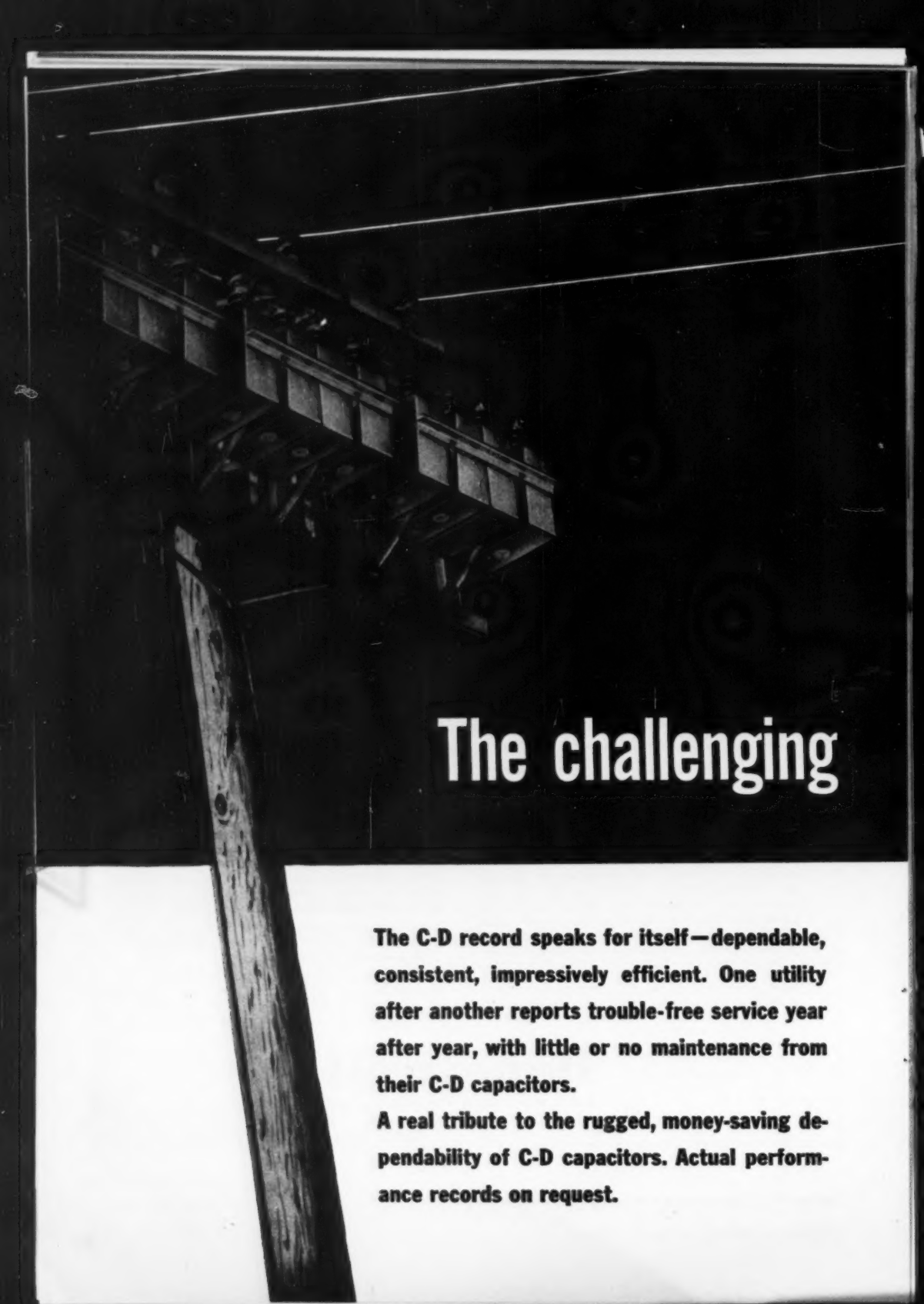
The *ElectroniK* recorder presents load data in full, readable detail on its big, 11-inch-wide strip chart, where every significant change and trend stands out for the dispatcher's attention. The rapid response of *ElectroniK* continuous-balance measuring assures full utilization of the inherent speed of the telemetering equipment. And the industry-proved dependability of *ElectroniK* construction means absolute minimum maintenance, and uninterrupted performance.

Your local Honeywell engineering representative will be glad to give you full details. Call him today —he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4568 Wayne Ave., Philadelphia 44, Pa. Service available promptly from more than 55 offices in principal cities of the United States.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

Bulletin 90-2, "Supervisory Instruments for Power Generation."



The challenging

The C-D record speaks for itself—dependable, consistent, impressively efficient. One utility after another reports trouble-free service year after year, with little or no maintenance from their C-D capacitors.

A real tribute to the rugged, money-saving dependability of C-D capacitors. Actual performance records on request.

performance of C-D capacitors

These exclusive C-D features mean more value for your capacitor dollar:

- Case SAND-BLASTED for longer-lasting finish
- Solderless service connector
- Heavy-duty wet process porcelain bushings for longer creepage path, less breakage, higher impulse rating
- Wide margin between paper and foil provides higher impulse level
- Capacitor impregnated and case filled with non-inflammable, non-explosive Dykanol
- Use of C-D's Dykanol results in lower unit weight per Kvar; high stability; long life
- Many small sections in series-parallel results in low voltage gradient; no corona; lowest dielectric unit stress
- Only C-D capacitors (from 230 to 13,800 volts), are tested at full rated voltage for a period sufficient to establish ultimate heat rise

If you are considering an installation of industrial, station or pole-type capacitors for power-factor improvement, you can save maintenance dollars by talking it over with a C-D engineer. Cornell-Dubilier Electric Corp., Dept. D-62-A, South Plainfield, N. J.

1910-1952

CONSISTENTLY DEPENDABLE

CORNELL-DUBILIER CAPACITORS

PLANTS IN: SOUTH PLAINFIELD, N. J.; NEW BEDFORD, WORCESTER, CAMBRIDGE, MASS.; PROVIDENCE, R. I.; INDIANAPOLIS, IND.; FUQUAY SPRINGS, N. C. AND SUBSIDIARY: THE RADART CORP., CLEVELAND, OHIO

ONE Nichrome

"One World." All over the globe, men have come to acknowledge this unique concept as the most effective basis for solving innumerable problems related to human progress.

"One Nichrome." All over the globe, men have come to acknowledge this unique alloy as the most effective means for solving a host of problems also related to human progress—in the fields of engineering and production.

This being so, we take particular pride in our trademark: NICHROME—granted solely and wholly to us by the United States Patent Office forty-three years ago. Representing a series of superb electrical heating and resistance alloys, developed and produced *only* by Driver-Harris, it symbolizes top quality and utmost dependability to manufacturers everywhere.

**T. M. Registered in United States Patent Office by Driver-Harris Company August, 1909*

World-Famous **Nichrome*** is produced only by

Driver-Harris Company

HARRISON, NEW JERSEY

BRANCHES: Chicago, Detroit, Cleveland, Los Angeles, San Francisco

Manufactured and sold in Canada by The B. GREENING WIRE COMPANY, LTD., Hamilton, Ontario, Canada

Factories: U. S. A., CANADA, ENGLAND, IRELAND, FRANCE, ITALY, SPAIN Representatives in 38 COUNTRIES

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

Bartlett-Snow coal handling at Meredosia

General View of Meredosia Power Station
Central Illinois Public Service Co.
Sargent and Lundy
Consulting Engineers

● The illustration above shows the first 100,000 KW unit of a plant which is to be extended into a 200,000 KW station. All coal handling equipment including the receiving and reclaiming hoppers and grillage, duplex feeder, conveyors, galleries, breaker screen and all supporting structures were fabricated in our shops, and installed by us, to Sargent and Lundy's specifications. For maximum efficiency and fixed unit responsibility, let the Bartlett-Snow coal handling engineers, with their long experience and complete facilities, work with you on your next job.

Belt Conveyor in Tunnel
Handling Coal from Track Hopper

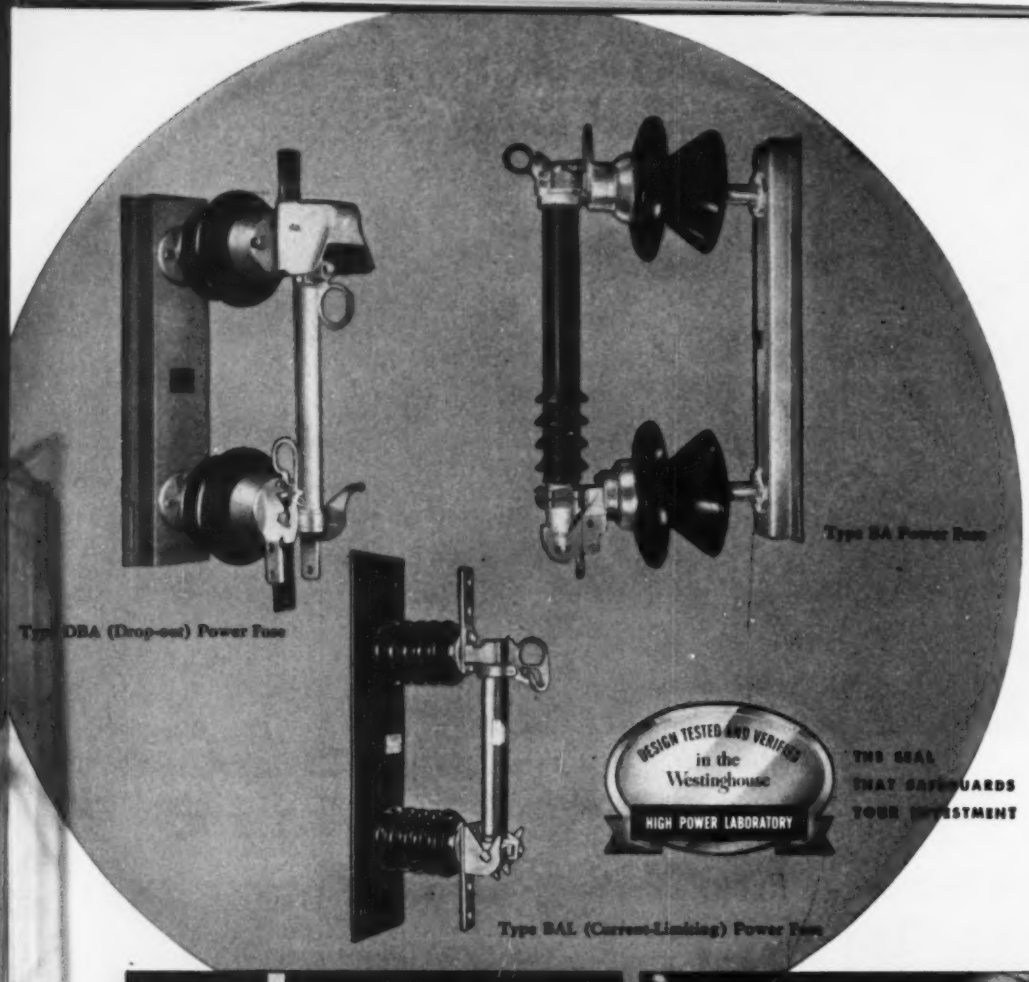
Drive for Collector Belt Under Breaker
the Refuse Belt and Automatic Sampler

DESIGNERS ENGINEERS

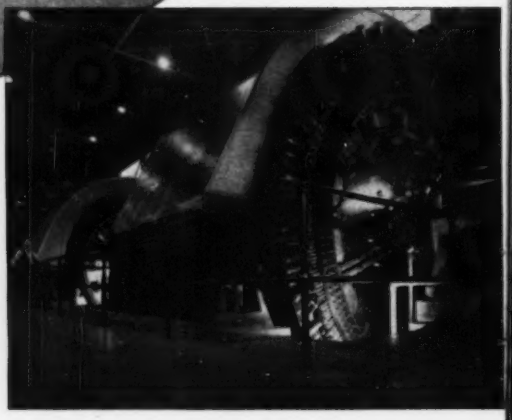
BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS ERECTORS

"Builders of Equipment for People You Know"



In a typical High Power Laboratory test, a Type DBA Fuse is shown interrupting the equivalent of a 3-phase, 1,000,000-kva fault. An instant after the photo was taken, the drop-out element operated, isolating the circuit.



Source of the laboratory's tremendous power are these two 60,000-kva generators. When paralleled, they are capable of delivering a 3-phase fault of 2,500,000 kva, or a single-phase fault equivalent to 4,000,000 kva.

ONLY *CONTROLLED* LABORATORY TESTING CAN PRODUCE THESE RESULTS:

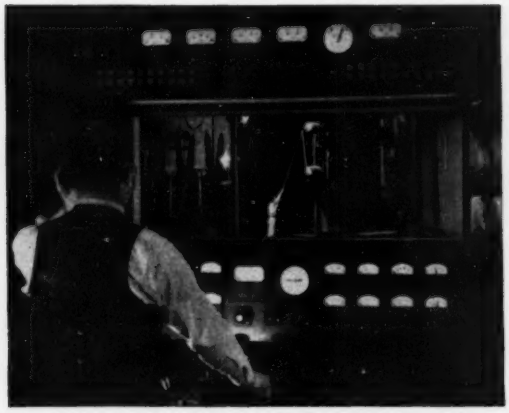
1. Application of Boric Acid Idea to Power Fuses

2. Proved Operation under all Circuit Conditions

In 1931, the Westinghouse High Power Laboratory—already five years old—played a major role in the development of the boric acid fuse. Conducting multiple tests under controlled conditions not available in the field, Westinghouse Laboratory technicians proved conclusively the soundness and superiority of the boric acid interrupting principle. The result is a complete line of low-cost protective devices proved to a degree unattainable by other means of testing. Considering the extent of your investment in fuse-protected equipment, this extra measure of sureness is an invaluable advantage. And it's one you get only when you specify Westinghouse.

Continued High Power Laboratory testing has also widened the application of this economical means of short-circuit protection. From the first Type BA Fuse, low-cost interrupting capacity has advanced with the development of Types DBA (drop-out) and BAL (current-limiting) until now 138,000-volt fuses that interrupt one million kva are available.

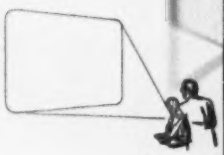
FOR COMPLETE INFORMATION on Westinghouse Power Fuses ask for a copy of Booklet B-5469. Contact your Westinghouse representative or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60781



From this control desk, a single operator guides all high power testing facilities. The control room also houses indicating instruments, protective relays, sequencing drums, and oscillographs which simultaneously record as many as eighteen variables.

See "Electrical Proving Ground"

...the dramatic story of the Westinghouse High Power Laboratory in sound and color motion picture. For details, see your Westinghouse Representative, or write: Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania.

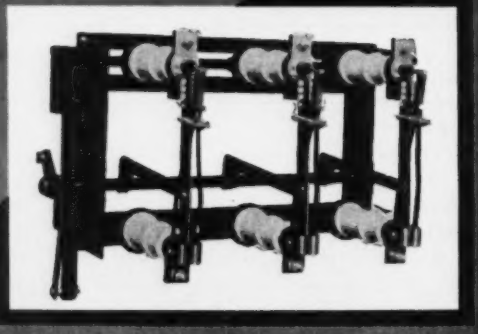


YOU CAN BE SURE ... IF IT'S Westinghouse

POWER FUSES

WESTINGHOUSE

it's the AIR that SLASHES MAINTENANCE COSTS !



It's the switching movement of every Brown Boveri Load Break Switch, generating its own compressed air, which instantly extinguishes the arc and eliminates scorching of contacts. That is why a Brown Boveri Load Break Switch provides 500 FULL CURRENT INTERRUPTIONS WITH NO MAINTENANCE or REPLACEMENTS.

These switches are designed for sub-station and branch line service. They eliminate the danger of fire, explosions and fumes.

Brown Boveri Corp. 19 Rector St., N. Y. 6
Please send me data on
LOAD BREAK SWITCHES.
Name ..... Title .....
Company .....
Address .....

High Operating Speed and High Breaking Capacity, they are available for 7.5 kV (interrupting 10,000 kVA) and 15 kV (interrupting 15,000 kVA) — for indoor service, and in a steel housing for outdoor service.

WRITE FOR DATA!

BROWN BOVERI CORPORATION
19 RECTOR STREET, NEW YORK 6, N. Y.

BROWN BOVERI

Meet **MAC GORDAN** of Baltimore. He's our Purchasing Agent. His job is to locate suppliers who can produce materials and parts suitable for use in making Locke Insulators. He also sees to it that these suppliers come through with products which meet Locke's manufacturing standards. "You'd be surprised," remarked Mac, "how tough it is for us to find suppliers who produce materials and parts which come up to our 'specs'. It looks to me as if Locke has the highest, most rigid quality standards in the industry." We asked Mac to prove his point. He came up with three good examples. Here's the story, as he told it to us.

Here's why Mac Gordan pays premium prices for parts and materials used in making

LOCKE

Suspension Insulators

"Suppliers," says Mac, "simply can't meet our specifications with ordinary parts and materials."

"For example, take the case of our No. 1840 High Voltage Suspension, shown on this page. Our specification calls for forged steel ball bolts. These ball bolts must have ductility enough to neck-down before they break in a destructive pull test. They must also be capable of taking a 30° bend over a ⅛" radius in the neck area without breaking. This guarantees uniformly good tensile strength in the finished insulator. Suppliers had great difficulty meeting this unusual 'spec' with their generally accepted bolts. To give us the extra quality we demand, suppliers therefore charge us a premium price amounting to thousands of dollars extra a year. We absorb these extra costs, because we feel that our customers deserve this added assurance of trouble-free service."

On the next page Mac cites two more examples of Locke's use of premium parts in making insulators which give you premium performance ----

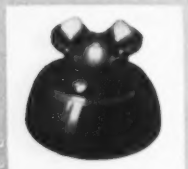
"The premium parts used in making our Suspensions are the best protection we can offer our customers," says Mac Gordan. "They want trouble-free service...we try to give it to them."

"A case in point," says Mac, "is this 6 inch dead-end. We had an opportunity to buy caps for this insulator for much less than we'd been paying. In checking, we found tiny cracks developing in the castings of these cheaper caps. We were told these shrink cracks were inevitable and wouldn't weaken the casting. But rather than lower our standards, and take a chance on quality, we decided to pass up this cheaper cap. We now use a premium-priced cap which costs us thousands of dollars a year extra. We absorb this cost because it gives customers the extra quality they expect in Locke 6-inch discs."

"Take this 25,000 pound Suspension," Mac continues. "Here's another case of 'what's good enough for others, often isn't good enough for us'. We wanted a new cap for this insulator. One supplier quoted a price 25 cents less than the usual price. Again, this cheaper cap was apparently well-accepted. In checking, we found lumps inside the casting, which though invisible, would tend to weaken the insulator assembly. What's more, the castings would not pass our gage for cotter key hole, roundness of lip diameter, and inside height and profile. The cap was obviously inferior. We're now paying 25 cents per insulator more than the average for this cap. This is just another good example of how we protect our customers at all times by using premium parts and materials."

YOU ARE EQUALLY SURE of getting a masterpiece of design when you specify other products in the complete line of Locke insulators and suspension hardware. Each pays off in superior performance on transmission and distribution lines, generating stations, sub-station and electrical apparatus. Locke Department, General Electric Company, Baltimore, Md.

LOCKE



LOW VOLTAGE PIN TYPE INSULATORS

HIGH VOLTAGE PIN TYPE INSULATORS

SUSPENSION INSULATORS

SWITCH & BUS INSULATORS

SPOOL INSULATORS

GUY INSULATORS

LIQUID-FILLED BUSHINGS

SUSPENSION & STRAIN CLAMPS

SUSPENSION HARDWARE

ENTRANCE BUSHINGS

UTILITY WORKHORSE-

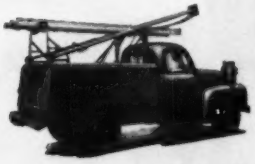
LINE CONSTRUCTION BODY (500)
Medium and heavy duty work. Vertical compartments are optional . . . can be equipped to fit individual needs.

FOR LONG LIFE AND TROUBLE FREE SERVICE

All *Powers-American* bodies have *earned* the reputation of "workhorse" of the utility industry by years of faithful performance. No matter how tough the job or the operating conditions, they pull more than their share of the load by stepping up crew efficiency and lowering operating costs. Whatever your utility body needs, *Powers-American* is your *1* source for *all types* of utility bodies and equipment. Write today for more information. Put a *Powers-American* "workhorse" on your job and watch the team pull ahead!

REVOLVING AERIAL LADDER
Models available in working heights of 23' 6", 26' 6", 30' 6", and 32' 6" for all styles of bodies.

"The Accepted Standard with Utilities Everywhere"



LIGHT DUTY MAINTENANCE BODY (350)
Fold-over type derrick will handle poles up to 40' in length. 24' ladder extends from rear of body.

HYDRAULIC TOWER
Available in sizes from 21' to 30'. Platform revolves full 360°. Tower can be operated from cab or platform.

LINE CONSTRUCTION BODY (600)
Completely equipped to carry all tools and materials needed for line work. Can be furnished with winch and derrick, compressor, digger, or any special equipment required . . . for use in any phase of the utility industry. Available in 9' to 14' lengths, with or without built-in crew compartment.

POWERS *American* DIVISION

ACB

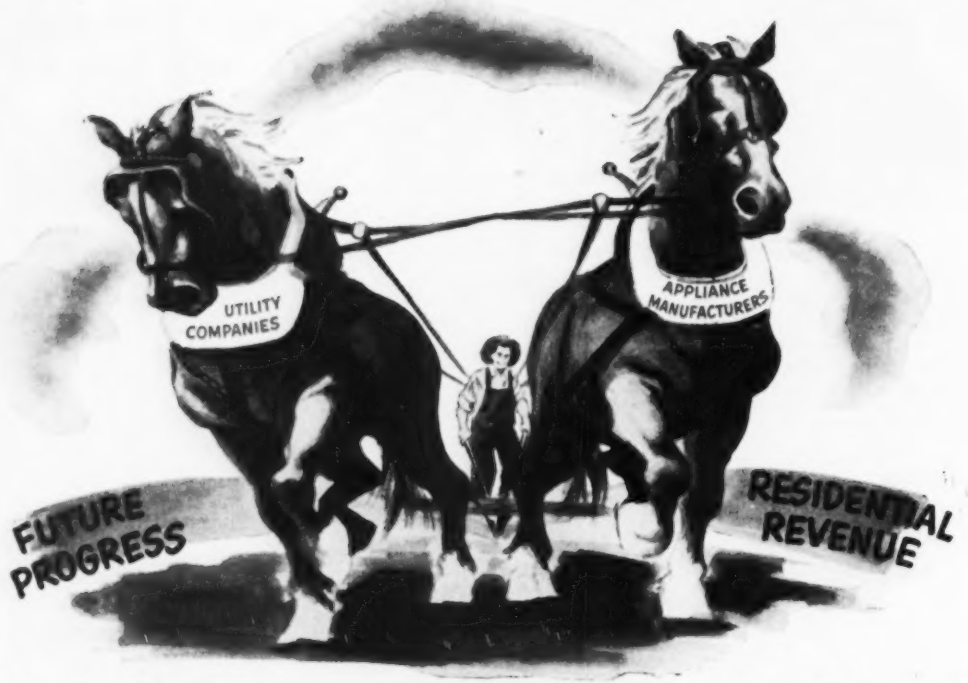
There are many styles of *Powers-American* Bodies not shown here. Write for descriptive catalog today.

PUBLIC UTILITY BODIES AND EQUIPMENT

McCABE-POWERS AUTO BODY COMPANY

HOME OFFICE: 5901 North Broadway, St. Louis 15, Mo.
WESTERN OFFICE: Latham Square Bldg., Oakland 12, Calif.

We Need Each Other For the Long Pull!



Here's the Answer to a Problem We Both Face!

If the goal of all-electric living in our nation's homes is to be reached, unrelenting team-work between the utility companies and appliance manufacturers in the promotion of "growth" or low saturation appliances is essential. We need each other. Increased residential revenue will come from the new appliances such as Dishwashers—Disposalls®—Freezers—Automatic Dryers—Ironers—Automatic Washers—not to forget Electric Ranges, and Water Heaters. Other appliances for the kitchen and home laundry largely are for replacement and produce little or no additional utility revenue.

With a tradition of close cooperation and understanding of utility problems, Hotpoint is taking the lead in effecting a transition which gradually but surely is bringing complete electric living nearer a reality. In addition to its aggressive promotion of today's low-saturation appliances, Hotpoint leads in the promotion of all-electric kitchens and home laundries, and in building acceptance for a full and complete line of electrical servants—not for just one or two appliances.

In the days to come, as all-electric living moves further ahead, Hotpoint will have opened avenues to better balanced and more profitable domestic electrical load. To aid in the solving of our mutual problems, we now have available for you a new study on Balanced Revenue Building Through Selective Selling and a Consumer Survey Plan for Retail Salesmen. You can get full information on these studies by writing the Utility Division, Hotpoint Inc., 5600 West Taylor Street, Chicago 44, Illinois.

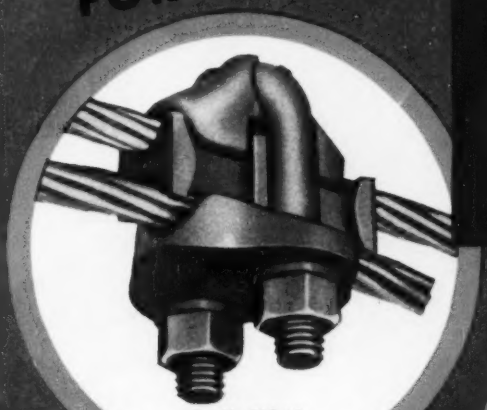
Hotpoint Inc.

(A General Electric Affiliate)

5600 West Taylor Street, Chicago 44, Illinois

NOW— Better Protection FOR YOUR ALUMINUM LINES! ...with

BLACKBURN Aluminum CABLE CLAMPS



Cat. No. DLC 6-0
Dead End Loop Clamp

Cat. No. PAC 6-0
Parallel Groove Tap Clamp

- **High-Strength Construction**
  Heat-treated aluminum alloys plus high-strength galvanized U bolt for maximum strength.
- **Protects Conductor**
  Design of spacer holds wires round, prevents damage to conductor.
- **Better Holding Ability**
  Large contact surface plus unique design of spacer gives clamp extra holding ability.
- **Large Wire Range**
  Only one size to stock for 6 through 1/0 ACSR.
- **Competitively Priced**
  You get more in this clamp, but it costs no more.

- **A Stronger Clamp**
  Huskier, with larger high-strength bolt.
- **Better Contact**
  More contact surface plus better gripping ability produces a tighter trouble-free connection.
- **Bonded Copper Liner**
  Securely bonded to the aluminum clamp so that it will not come loose — protects against electrolysis.
- **Complete Line**
  Clamps available for Aluminum, Aluminum to Copper, and Armor Rod.
- **Large Wire Range**
  All clamps are for 6 through 1/0 ACSR — Only one size to stock.

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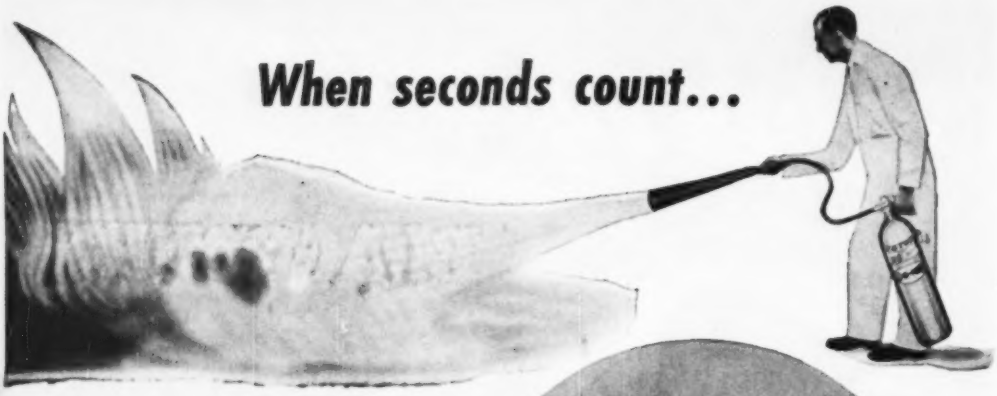
35 MADISON ST. • ST. LOUIS 6, MO.
Phone CEntral 3007

▶ *Send for Samples Today!*



C-O-TWO SQUEEZ-GRIP

assures speedy action!

A quick squeeze of the lever and you get fast, positive fire protection with C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers . . . no loss of time or carbon dioxide while maneuvering around a fire. The C-O-TWO Squeez-Grip Valve is the greatest single contribution to the releasing of carbon dioxide for first aid fire fighting. Easy maintenance . . . only periodic weight checks required . . . carbon dioxide is good until used, not subject to freezing.

Carbon dioxide is a clean, dry, non-damaging, non-conducting, odorless inert gas . . . dilutes the oxygen content to a point where fire can not exist . . . penetrates every nook and corner. Carbon dioxide is one of the fastest and safest fire extinguishing agents known . . . equipment, materials and finishes remain undamaged . . . surfaces stay dry and even food remains perfectly edible. After the fire, carbon dioxide disappears quickly without a trace.

Quality built and fully approved . . . C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers are highly effective on flammable liquid and electrical fires, as well as some surface fires involving ordinary combustible materials . . . rated by Underwriters' Laboratories, Inc. and Factory Mutual Laboratories for class B and C fires.

Convenient 2½, 5, 10, 15 and 20 pound hand sizes . . . discharge horn non-conducting, corrosion resistant, shatterproof, non-metallic construction.

Also, convenient 50, 75 and 100 pound wheeled sizes . . . available with sturdy, wide-faced wheels either with or without rubber tires, as well as available with or without discharge hose and horn protection cover.

Act now for complete free information on these top quality fire extinguishers. Remember . . . you can't put fire off . . . fire doesn't wait. Get the facts today!

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers • Built-In Smoke and Heat Fire Detecting Systems

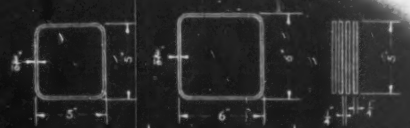
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems

save copper

CHASE Ventilated Square Bus Conductors cut copper needs up to 36%

Look at the weight savings when you use Chase Ventilated Square Copper Tube Bus Conductors. The table below tells the story.

Also—the ventilating holes give 20% more current carrying capacity. Get full information about efficient, strong and easy-to-install Chase Ventilated Square Copper Tube Bus Conductors. Send coupon for the free booklet.



Sizes	5" Square Tube Ventilated	6" Square Tube Unventilated	4-5"x¼"x¼" Flat Bars
Sq. in. metal area	3.20	4.15	5.00
Weight, lbs. per ft.	12.42	16.08	19.38
Amperes load	3350*	3350**	3350
Amperes/sq. in.	1047	807	670
Amperes per lb. per ft.	270	208	173
% Copper saved	36	17	

For higher currents these differences will be still greater.

*Good for 3720 amperes. **Good for 3700 amperes.

FREE Chase Copper Bus Conductor booklet gives physical and electrical characteristics and data on copper saving.

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

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Chase Brass & Copper Co. EW652
Waterbury 20, Connecticut

Please send me the *CHASE COPPER BUS CONDUCTOR BOOKLET.*

Name_____

Position_____

Firm_____

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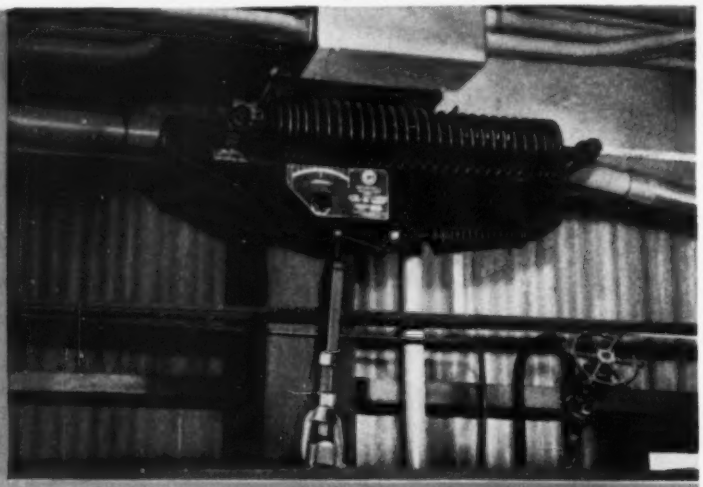
City_____ State_____

PIPING THAT MOVES

. . . calls for supports that are flexible



Grinnell Model I Constant-Support on 12-inch main steam at Somerset Power Station, Montaup Electric Co., Somerset, Mass. Pressure, 1300 psi; temperature, 950°F; load, approximately 4000 pounds. Note minimum headroom available.

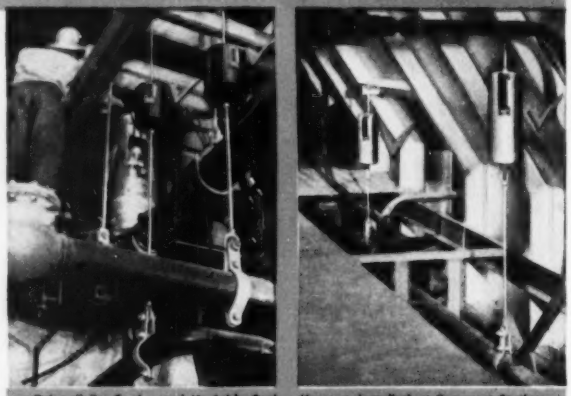
Thermal deflection of piping in today's high pressure, high temperature power stations necessitates flexible support of piping.

Where reactive forces at terminal points in a piping system must be kept within specified limits, constant-support type hangers are recommended. They are designed to provide substantially uniform supporting force equal to the pipe load throughout the travel range and should be used at superheater outlets, turbine connections, and also on high temperature and other critical lines.

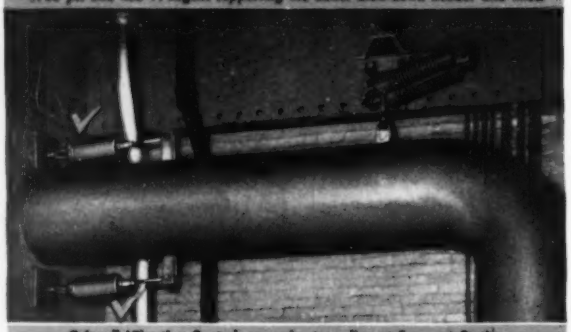
When pipe lines are subject to vertical movement and restrictive conditions do not require the use of a constant-support type, variable spring hangers are recommended. They should be designed to support not less than 85% or more than 120% of the designed load for the total travel.

When necessary to prevent abnormal movement or vibration in pipe lines, controls or sway braces of the energy-absorbing or instant-acting, counter force type are recommended.

Grinnell manufactures a complete line of engineered pipe hangers and supports; maintains a laboratory staff of trained technicians; provides highly skilled assistance and advice right from the design stage; and offers experienced field engineering service.



Grinnell Pre-Engineered Variable Spring Hangers installed at Somerset Station. Left: supporting boiler feed discharge lines, carrying water at approximately 1785 psi and 455°F. Right: supporting the boiler blow-down header and lines.



Grinnell Vibration Controls on main steam line at Somerset Station.

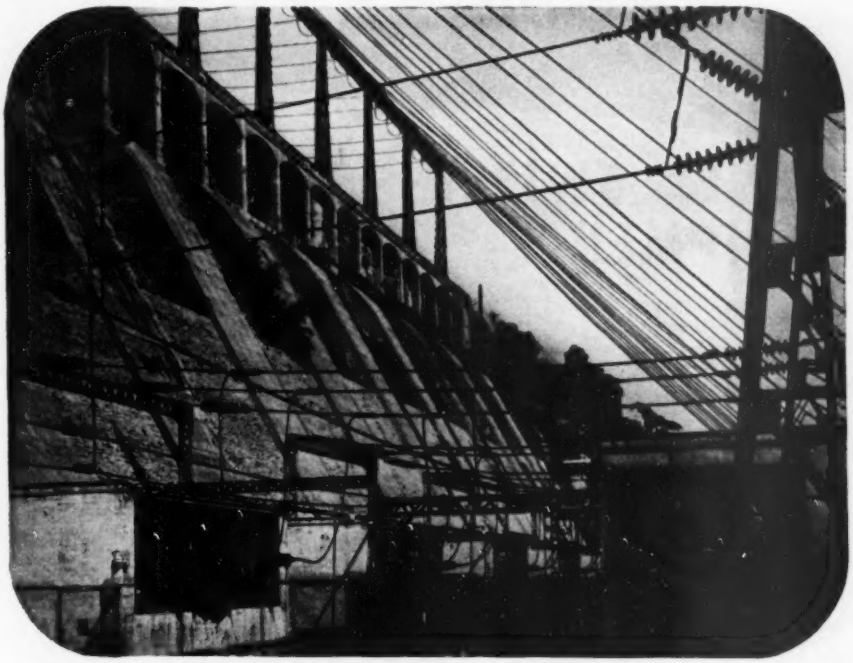
GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPLIES

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

V. C. CABLE



Specify Roebling V. C. Cable for top resistance to heat, oil and grease

THROUGH continual laboratory developments and progressive manufacturing methods, Roebling Varnished Cambric Cable has been constantly improved. Today this cable has absolutely top resistance to heat, oil and grease . . . and it's the most dependable cable you can use for leads on generators, transformers, motor and oil switches, and for general distribution of heavy power loads in manufacturing and industrial plants.

Roebling V.C. is made in single conductor sizes from 2,000,000 C.M. to #14 A.W.G.; in multiple conductor sizes from 750,000 C.M. to #14 A.W.G. Recommended for use to 17,000v between phases in single or multiple conductor construction; and to 26,000v for single conductor grounded neutral.

Large quantities of Roebling's complete wire and cable line are now required for rearmament. We and our distributors will, however, do all that we can to meet your needs. John A. Roebling's Sons Company, Trenton 2, N. J.

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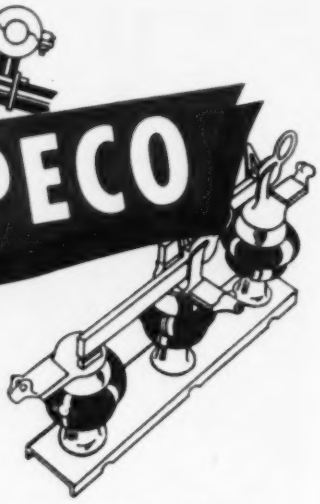
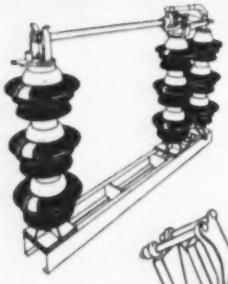
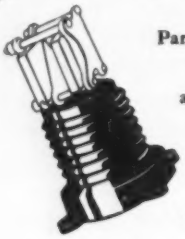
FOR DEPENDABLE TROUBLE-FREE PERFORMANCE

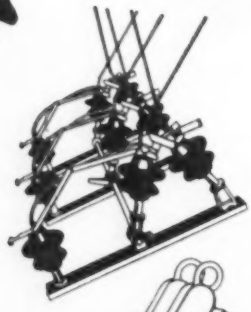
install ELPECO

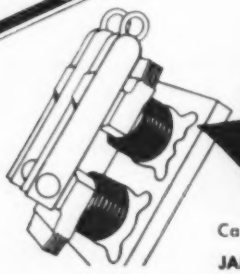


POWER SWITCHING EQUIPMENT









For over 40 years the Elpeco line of high-quality power switching equipment has been known for its outstandingly dependable and trouble-free performance. Constant research and redesign have enabled Elpeco to *anticipate* rather than meet the ever changing demands and requirements of the electrical industry. Particular buyers, who have specified Elpeco products over the years, know that when they buy Elpeco Indoor and Outdoor Disconnect Switches, Air Break Switches, Indoor and Outdoor Bus Supports, Bus Ducts and Substations . . . they are getting the finest, most modern equipment on the market. All Elpeco products conform to NEMA and AIEE standards for performance.

A new series of bulletins, completely illustrating and describing each item in the Elpeco line is now available. Let us know the particular type of equipment in which you are interested. We'll be glad to send the appropriate bulletins by return mail.

ELPECO

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JAMES R. KEARNEY CORP. of Canada, Limited, Guelph, Ontario

we keep help on tap for top management...

At your fingertips, through EBASCO, is the specialized help of engineers, constructors and business consultants. In a single organization EBASCO combines top-flight talent with experience that penetrates every phase of the utility industry.

EBASCO is flexible. It can concentrate on a specific, immediate problem . . . or on a whole broad range of operations. It includes the functions of engineers, designers, financial consultants, sales and marketing specialists, cost analysts—whatever specialized skills the problem calls for.

EBASCO men have designed and constructed over one billion dollars worth of new plants. They have built pipelines; made business studies upon which bankers and other executives have based important decisions; helped solve production problems; assisted in developing industrial relations programs. For nearly fifty years, EBASCO has served business and industry in all parts of the world.

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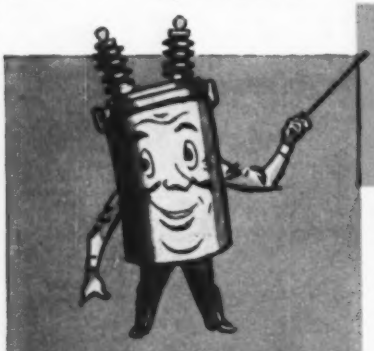
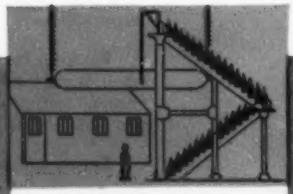
BALANCED

HiperCore 4 point superiority for Balanced Performance



1. Smaller Size

Reductions in size range up to 30% because the oriented cold-rolled silicon steel used in HiperCore Transformers has 30% to 35% higher flux carrying capacity. Consequent reductions in the weights of steel, copper, oil and other materials used results in a smaller and lighter weight transformer with decidedly improved all-around characteristics.



2. Surge-Tested Design

Maloney HiperCore Transformers are of surge-tested design. Maloney's 3,600,000 volt surge generator is used to test the ability of HiperCore Transformers to withstand lightning and other surges. Surge-tests far in excess of normal operating conditions are run to insure a longer, more efficient, trouble-free operating life.

FACTORIES AT ST. LOUIS 20, MISSOURI AND TORONTO, ONTARIO, CANADA

PERFORMANCE

. . . the result of skill and experience

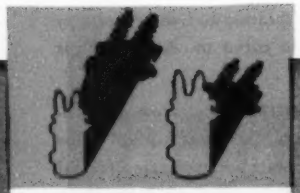
IT looks so easy! But . . . you know it's not! This fellow has to keep his mind on his work and walk a straight line. So it is with a transformer . . . it must keep working day and night. It must operate efficiently under normal conditions in addition to being able to handle overloads, surges, and what have you, without an interruption of service . . . in short, *balanced performance.* Thus *balanced performance* cannot be achieved when one feature is emphasized at the expense of other features. Therefore, it would be well to check all the features of a transformer to be sure that it will perform as you want it to . . . *continuously* and *efficiently.* We feel that such precaution will result in the selection of Moloney HiperCore Transformers for your distribution system.

MEDE-12

MOLONEY ELECTRIC COMPANY

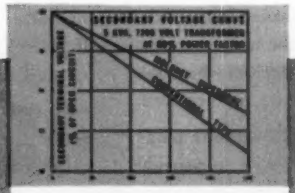
Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

SAINT LOUIS 20, MISSOURI



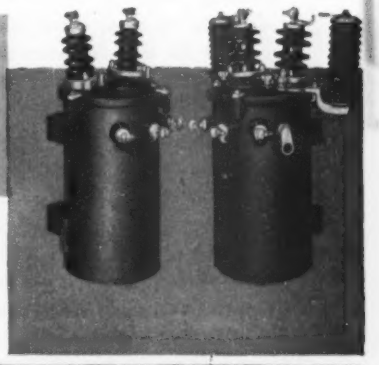
3. Greater Short-Time Overload Capacity

Moloney HiperCore Transformers have improved short-time overload characteristics which provide better peak load performance and longer life. Reduced coil mass, achieved through use of oriented steel cores, together with the extensive use of cooling ducts, results in more rapid cooling of the windings and in a lower hottest-spot temperature gradient.



4. Better Voltage Regulation

The smaller cores of HiperCore Transformers make possible windings having lower impedance. Lower impedance provides lower internal voltage drop at all loads. This is especially important during peak load periods, since HiperCore transformers can carry higher overloads than older types, at the same permissible regulation.



SALES OFFICES IN ALL PRINCIPAL CITIES

Another Westinghouse Relay Development

Here's the greatest advance in Basic Relay Design in Half a Century!

The New CO Relay

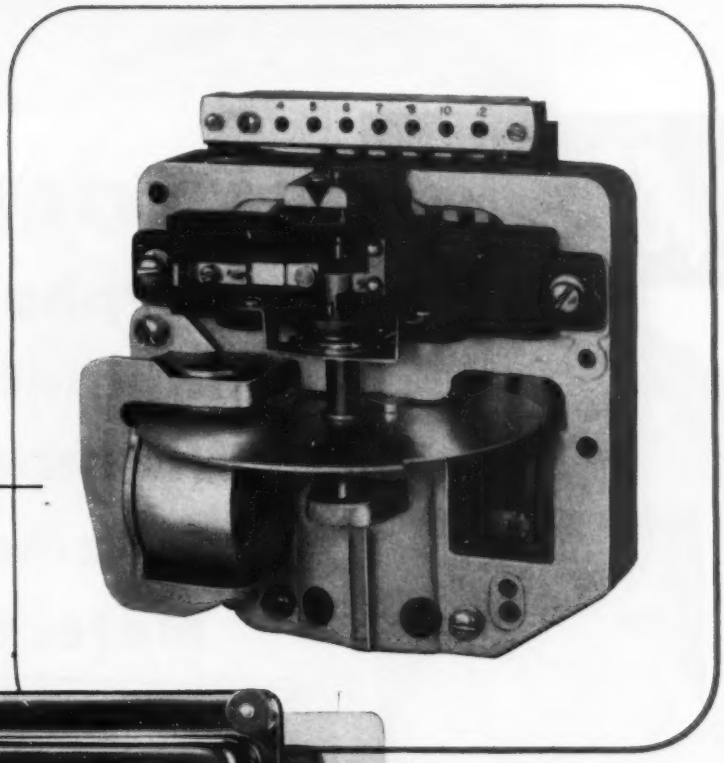
This new CO Relay brings you remarkable, new operating benefits in overcurrent relaying. The reason—the most significant advance in relay design since the introduction of the induction disc relay! We call it simply the "E" element—but look how it contributes to superior relay performance.

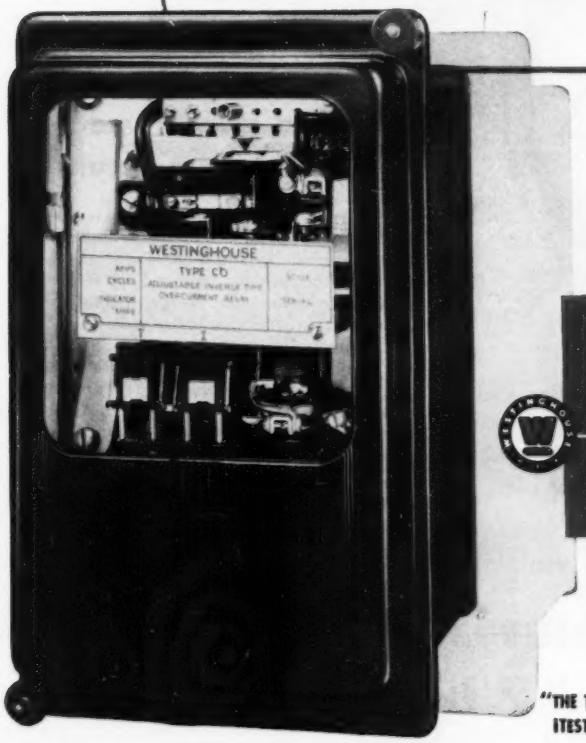
FOR GREATER ACCURACY . . . Magnetic plugs control the saturation characteristics to provide accurate timing over the entire operating range. Two independent adjustments provide accurate pickup at tap value of current for all disc positions. Micrometer adjustment of permanent magnet, by means of a "keeper" screw, which provides accurate adjustment without moving the magnet. Thus, four separate and independent tolerance controls, instead of only two as found on earlier relays, assure you of meeting time curves without compromise.

FOR GREATER FLEXIBILITY . . . A "Two-in-one time curve." Inverse and very inverse relays are identical except for calibration and, therefore, may be changed from one curve to the other (or intermediate curve).

FOR GREATER RELIABILITY . . . New positive-action tap block with "self-positioning" taps give metal-to-metal contact between tap terminal and tap plate. Other features contributing to reliable relay protection include: rigid one-piece, die-cast frame—cast alnico magnet—and non-geared design.

Ask your Westinghouse Representative to show you the new CO Relay—he'll be glad to go over it feature by feature with you—or request a demonstration by writing to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40410





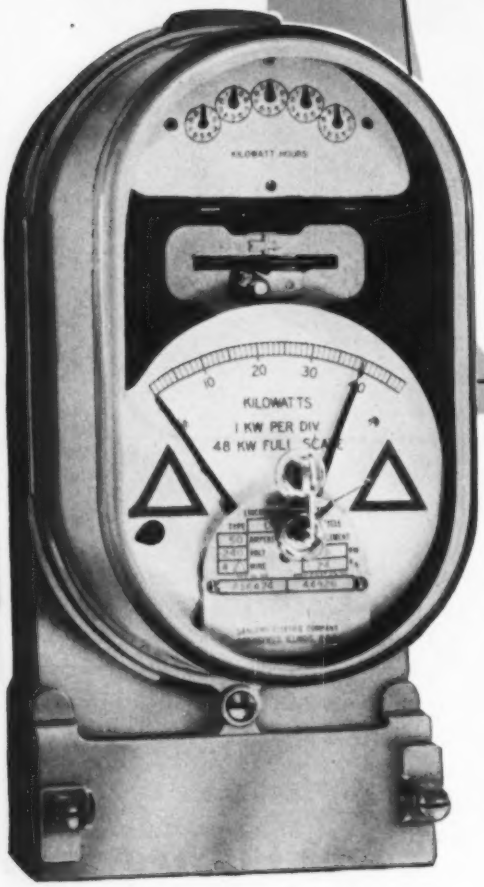
Westinghouse

RELAYS

"THE TYPE CO OVERCURRENT RELAY IS AVAILBLE IN FLEX-ITEST OR STANDARD RECTANGULAR PROJECTION CASE."

NEW...

SANGAMO
Polyphase Combination Watthour and Demand Meters



TYPE LWP

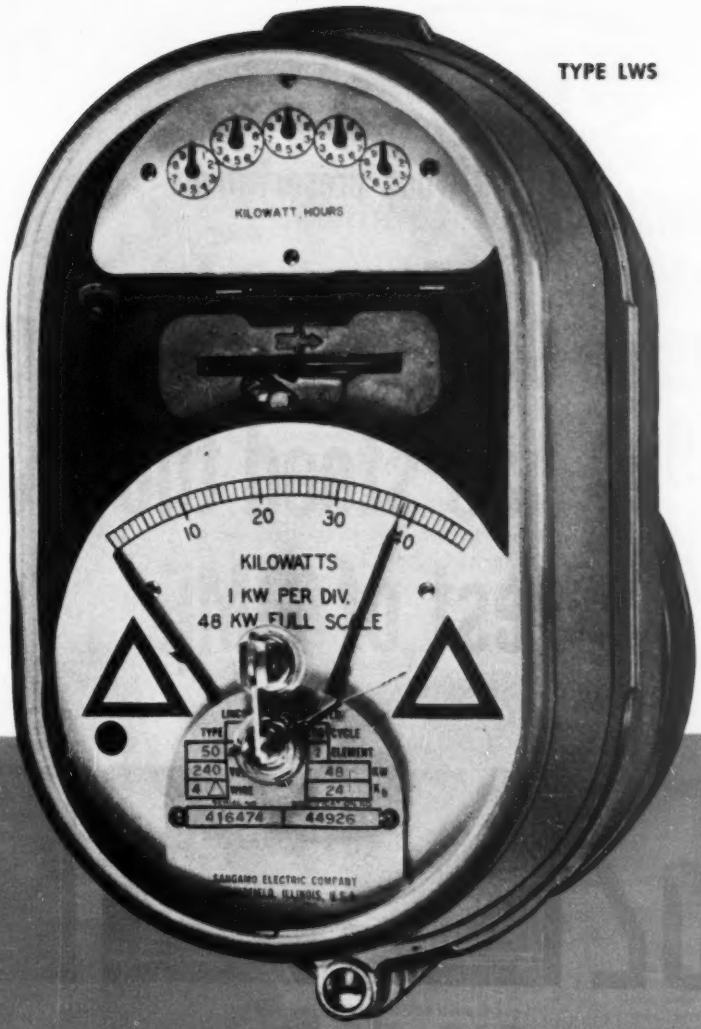
...for convenient, dependable demand measurement on all polyphase circuits!

The Type LW line of combination watthour thermal demand meters combines a completely standard Sangamo Type LC polyphase watthour meter with a fully shielded Lincoln Type WD watt demand meter of the latest design, having excellent inherent characteristics under widely varying ambient temperature conditions. As in other Lincoln combinations, *no sacrifice* has been made of the established characteristics of either the watthour meter or of the demand meter, since they operate entirely independently of one another.

Types LWP and LWS

Both the Types LWP and LWS meters are supplied in 2-element form for 3-phase, 3-wire; 3-phase, 4-wire Delta; and 3-phase, 4-wire Y. The bottom-connected Type LW is supplied with the conventional polyphase terminal block providing for a maximum of 8 current and 7 potential terminals. The socket Type LW can be furnished either with a 5 terminal base for *network* 3-wire metering, or with as many as 10 terminals for regular polyphase connection.

SM52-6



The efficient Lincoln thermal actuating element functions entirely independently of the watthour meter. Lincoln demand meters contain only one element that moves, and that moves very slowly. It consists of a center shaft on which are mounted the indicating pointer and two equal and opposing coiled bimetal strips. These bimetal coils are thoroughly aged under conditions much more severe than full scale operation and are also very accurately paired for balance under wide temperature variations.

Only Measured Facts are Known Facts

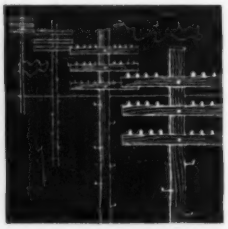
SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

1852
1862
1872
1882
1892
1902
1912
1922
1932
1942
1952

Of all wood preservatives

only Coal-tar Creosote has stood the test of TIME



For more than 100 years, under the most severe and exacting conditions, Coal-tar Creosote—and ONLY Coal-tar Creosote—has been proved successful. In cold, hot, damp and dry climates . . . in salt water and fresh water . . . Coal-tar Creosote gives maximum wood protection at minimum cost.

Be sure it's **Barrett*** Coal-Tar Creosote

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

*Reg. U. S. Pat. Off.

This Mark HOLAN

identifies the most efficient Utility Bodies you can use

The yearly savings, made possible by well designed utility bodies, is becoming more and more apparent to utility executives. That is why men in the industry are so enthusiastic about the many advanced features developed by Holan engineers.

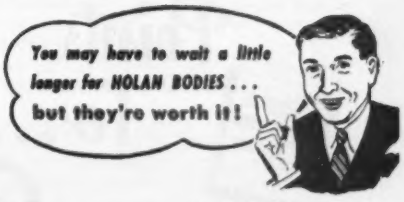
Holan utility bodies can help you solve the problem of rising costs versus controlled rates. There is a complete line of Holan bodies for construction, maintenance and service work.

Model 1520 Aerial Ladder can be carried overhead and leaves the truck bed clear. Available with platform heights of 19, 21 and 23 feet.

Model CLC-138 Line Body with four man crew compartment. Many standard line body models are available, with or without crew compartments.

Model 1090LR General Service Body is one of nine standard Holan models for general service work.

The dependable name in utility bodies



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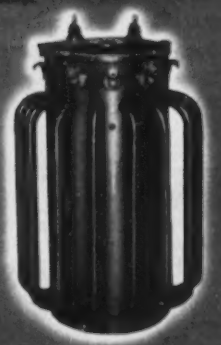
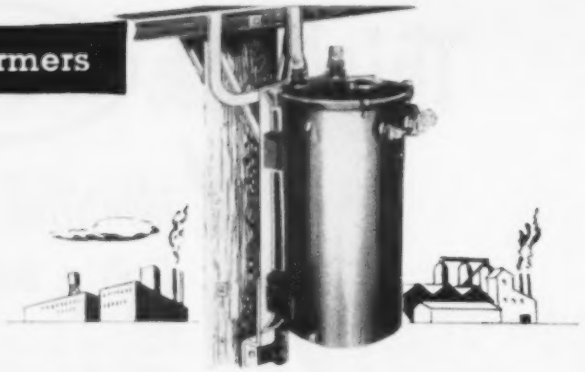
2401 Hutchinson Ave., Charlotte, N. C.

Schatky Equipment Corp.
1810 S. E. 10th Ave., Portland 14, Ore.

distribution transformers





When reliability is a factor...

When a transformer is to become a vital part of a distribution system, reliability is naturally the most important factor for consideration by technical and practical-minded buyers.

To attain the highest degree of reliability in distribution transformers, The Standard Transformer Company uses but one formula . . . put the best material, engineering skill and workmanship into the transformer that is available.

When you examine a STANDARD distribution transformer at close range, the sound, basic construction and outstanding features become apparent at once. You see that the cover is easily removed and is moisture-proofed with a Neoprene gasket that prevents oil leakage; a rugged copper-bearing steel tank, housing a low-loss core assembly of non-aging, varnish coated, silicon steel sheets; a well designed core clamping that assures quiet and reliable operation. You observe many additional details that quickly convince you that STANDARD builds reliability into distribution transformers that pay off in long, trouble-free service.

You'll want to know more about STANDARD distribution transformers . . . there's a STANDARD representative near you that will give you the information you need.

Everything Points To...

WRITE FOR BULLETIN
CL-50

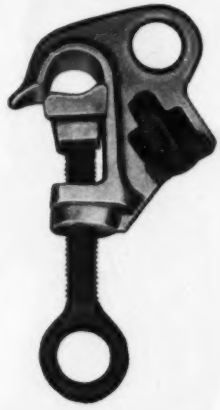
Tells the story with words and pictures of STANDARD'S complete line of transformers, and how they perform for every class of service . . . on the job.

Standard

WARREN, OHIO
REPRESENTATIVES IN PRINCIPAL CITIES

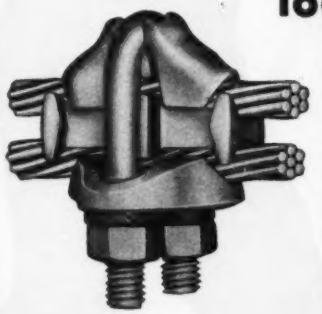
aluminum connection problems?

✓ check these WEAVER



aluminum hot line clamps

- ✓ Available for aluminum to aluminum or aluminum to copper connections at no difference in cost. All clamps cast of high strength, heat treated aluminum; main line tightening bolts and tap wire bolts cast of high strength aluminum silicon bronze.
- ✓ High strength bronze threaded insert is cast into the base of the clamp body so that bronze tightening bolt runs in bronze threads. There is no danger of Weaver Aluminum Hot Line Clamps freezing on the line.
- ✓ Bi-metal tap pad provides efficient copper tap wire connection. For aluminum to aluminum connections, plated tap bolt is used without bi-metal pad.
- ✓ Clamps will accommodate all main line sizes from #8ACSR to #1/0 ACSR over armor rods and tap wire sizes from #6 solid copper or #8ACSR to #2/0 stranded copper or #1/0 ACSR.



loop dead end clamps

- ✓ One clamp accommodates all ACSR sizes from #6 to #1/0.
- ✓ All wire sizes are completely enclosed and firmly held by the clamp. Flanges on the spacer bar and design of the wire grooves prevent the strands from spreading apart on tightening so that there is no danger of loosening.
- ✓ Top casting and tightening plate are cast of high strength, heat treated aluminum alloy. Spacer bar is cast of special aluminum alloy which firmly grips the cable when the clamp is tightened.
- ✓ U Bolts fabricated of high strength steel, and nuts, lockwashers and U bolts are all hot dip galvanized.

WEAVER PRODUCTS ARE PRODUCED COMPLETELY IN OUR OWN MODERN INTEGRATED FOUNDRY AND FACTORY FACILITIES. VISIT US WHEN YOU ARE IN ST. LOUIS.

J. A. WEAVER Company

2110 HOWARD ST. • ST. LOUIS 6, MO.

TELEPHONE CEntral 0881

Fire in the generator!

...says the KIDDE Smoke Detector

What if fire were smoldering in the insulation of your generator! Would you be warned in time to avoid a total breakdown? Could you save costly repairs and the heavy loss in "down" time?

A prompt alarm from the new Kidde Smoke Detector gives you just the warning you need. It means: there's trouble in your generator . . . better take action while there's still time!

The Kidde Smoke Detector spots slow burning fires instantly, long before there's enough heat to set off a heat actuated alarm. It's designed especially to protect generators, ventilating ducts, air conditioning systems or any hazard that provides a negative and positive air pressure zone.

Write today for full information.

Kidde

Walter Kidde & Company, Inc.
630 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

Proved Reliability... Verified by User's Reports

Type JE PACIFIC ELECTRIC *Frame-Mounted* CIRCUIT BREAKERS

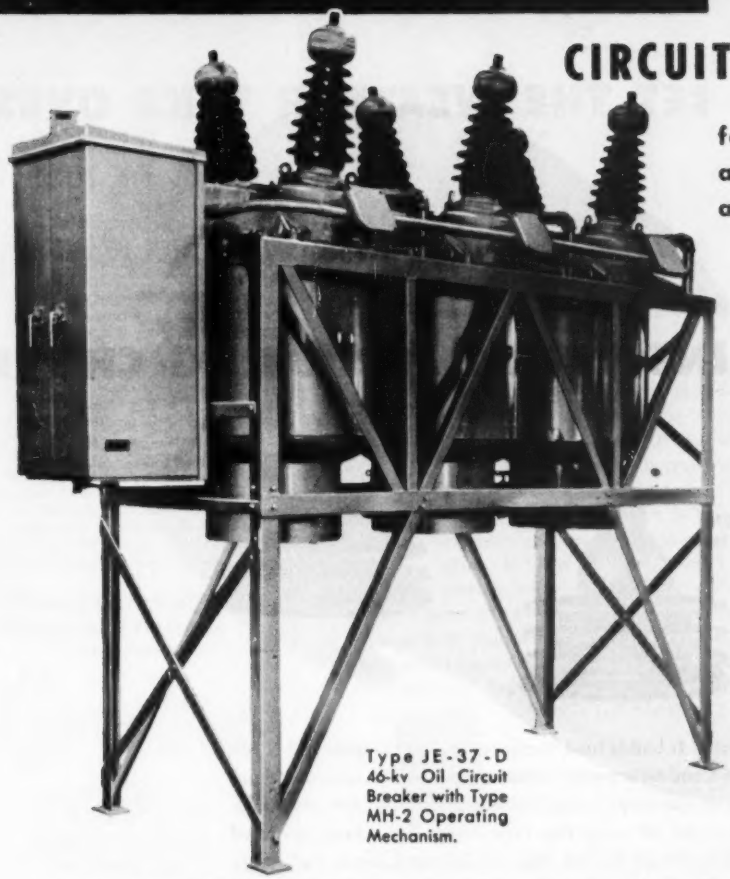
for Subtransmission and Distribution Lines, and Industrial Loads

23, 34.5, 46, and 69 kv
(Other Styles 7.5 to 230 kv)

•

ELECTRICALLY and MECHANICALLY TRIP-FREE in any position

NEMA and ASA STANDARD



Type JE-37-D 46-kv Oil Circuit Breaker with Type MH-2 Operating Mechanism.

USER'S REPORTS of Pacific Electric circuit breaker performance prove that on the average over the years Pacific's claims of reliable operation and low maintenance cost are realized beyond expectations.

Contributing to this record are that there is only one moving part inside of the tank (the one-piece rotary contact structure); fast and simple latching; low operating current; and that closing when once started proceeds at full speed, unaffected by drop or loss of control voltage.

Also the reclosing is always from full-open position, assuring maximum insulation during the critical surge time that follows an interruption caused by repetitive lightning.

Space does not admit of more than these few hints as to the exceptional performance of these circuit breakers. Catalog 548 explains further.

Since 1906

SALES OFFICES or AGENCIES in PRINCIPAL CITIES

PACIFIC ELECTRIC MFG. CORPORATION

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LET THE WEATHER TAKE OVER

YOUR INSULATOR-SCRUBBING CHORE

Lapp Standard (15,000 lb.)
Fog-Type Suspension Unit

Lapp High-Strength (25,000 lb.)
Fog-Type Suspension Unit

Industrial progress is wonderful! It builds load, increases national wealth, and is our hope for Peace by making us a formidable potential military power. But more and more industrial processes bring more and more contamination to transmission insulators. And some of it is sure hard to get off! Lapp Fog-Type design has a long record of successful service in areas of most severe salt fog, dust and industrial fumes. 56% more leakage distance than standard units gives it a big initial advantage. More uniform leakage path avoids arc-starting hot spots. And petticoat shape and spacing are such that wind and rain flush off accumulated dirt.

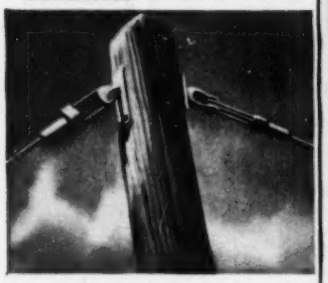
Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, NEW YORK

(Advertisement)

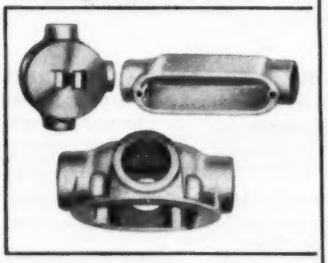
Electrical Applications of Aluminum

Stronger Splices and Deadends



Splices and deadends fabricated from aluminum tubing have proved highly successful for withstanding high pressures and heavy loads in widespread field applications. In addition to meeting the rigid strength requirements, aluminum is meeting with high favor in these electrical uses because of its corrosion resistant qualities, its workability before heat treating and its low cost. Thus aluminum has proved thoroughly satisfactory in both serviceability and in production economies. Snub-type deadends for *ACSR*, hot line clamps, tap clamps and split bolt type connectors are similar electrical applications that utilize the benefits of aluminum sheet, tubing, castings and extrusions.

Efficient Electrical Fittings and Fixtures



Many thousands of different types, sizes and shapes of die-cast aluminum electrical fittings and fixtures are in wide use today. One important reason for this popularity of aluminum is its weight. Aluminum fittings are light, easy to handle and costs less to ship and deliver to the job . . . yet are strong enough to withstand shock and strain far beyond actual job requirements. Aluminum is also rustproof and weatherproof and is highly resistant to chemical corrosion. The smooth satin finish inside and out of aluminum fittings protects fingers during installation and protects insulation on wire. Perfect uniformity in die-cast fittings and fixtures is easily obtained which makes installation easier, cuts costs and speeds up work. Write to Reynolds for details on these and any other electrical aluminum applications.

Make Important

✓ OFFICE SAVINGS
✓ FIELD SAVINGS
with Reynolds ACSR

Your *first* saving comes when you put through a Purchase Order for Reynolds ACSR. You'll find the original cost of this steel reinforced aluminum cable considerably less than other types of cable.

Saving number *two* comes in lower handling costs—ACSR's light weight slices dollars off freight car-to-storage-to-job-site charges.

Lower field costs give you saving number *three*. ACSR is faster, easier to string. ACSR is light yet strong—you can go to longer distances between poles—save up to four poles per mile. Or, because there is less sag to ACSR—you can use shorter poles or towers.

Figure out *your* potential savings. Then take advantage of them and specify Reynolds ACSR. Sooner or later you'll use aluminum—why not now? *Reynolds Metals Company, 2584 South Third Street, Louisville 1, Kentucky.*

FREE . . . ACSR MANUAL FOR ENGINEERS CONTAINS COMPLETE INFORMATION, CHARTS AND TABLES. Please request this booklet on your business letterhead.

NOW . . . 4 Reynolds Master Reels do the work of 100 wooden reels! Handle ACSR quicker and more economically. Eliminate reel inventory and exchange. Cut down on handling, storing, record-keeping as well as reducing damage cost to a minimum. Reynolds Master Reels and Coils are easily assembled by linemen right on the job . . . are sturdier than wooden reels.

For complete information

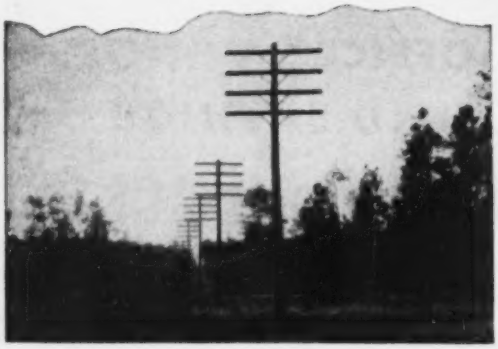
see your Reynolds distributors listed below or write direct to Reynolds Metals Company, 2584 South Third Street, Louisville 1, Ky.

Westinghouse Electric Supply Co., New York, New York (And branches) • North Coast Electric Co., Seattle, Washington • Griffin Manufacturing Co., Dallas, Texas • Southern Electric Supply Co., Houston, Texas • Williamson Sales Co., Shreveport, Louisiana (And branches) • California Electric Supply Corp., San Francisco, California

REYNOLDS METALS

REYNOLDS ALUMINUM

Amcreco CREOSOTED POLES



1 **INCREASES LIFE EXPECTANCY OF YOUR LINES** Carefully selected, naturally strong timber is scientifically pressure treated the entire length to produce poles of highest strength and durability. Service records showing from 25 to 40 years of useful pole life prove the long life expectancy of Amcreco creosoted poles.

2 **LOWERS INITIAL COST . . . REDUCES MAINTENANCE EXPENSE**—Poles of practically constant strength promote pole line economy. Smaller sizes and longer spans are possible . . . a lower factor of safety can be allowed . . . lines stay up longer . . . fewer replacements of poles and cross arms are required.

3 **GIVES DEPENDABLE SERVICE UNDER SEVEREST CONDITIONS**—Lines constructed with Amcreco poles are planned for the future. Built for permanence and dependable service under all conditions, Amcreco creosoted poles provide greater long-term economy.

Get the whole story about long lasting, money saving Amcreco poles. Ask for detailed information on actual service records. Write today.

Amcreco
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AMERICAN CREOSOTING COMPANY
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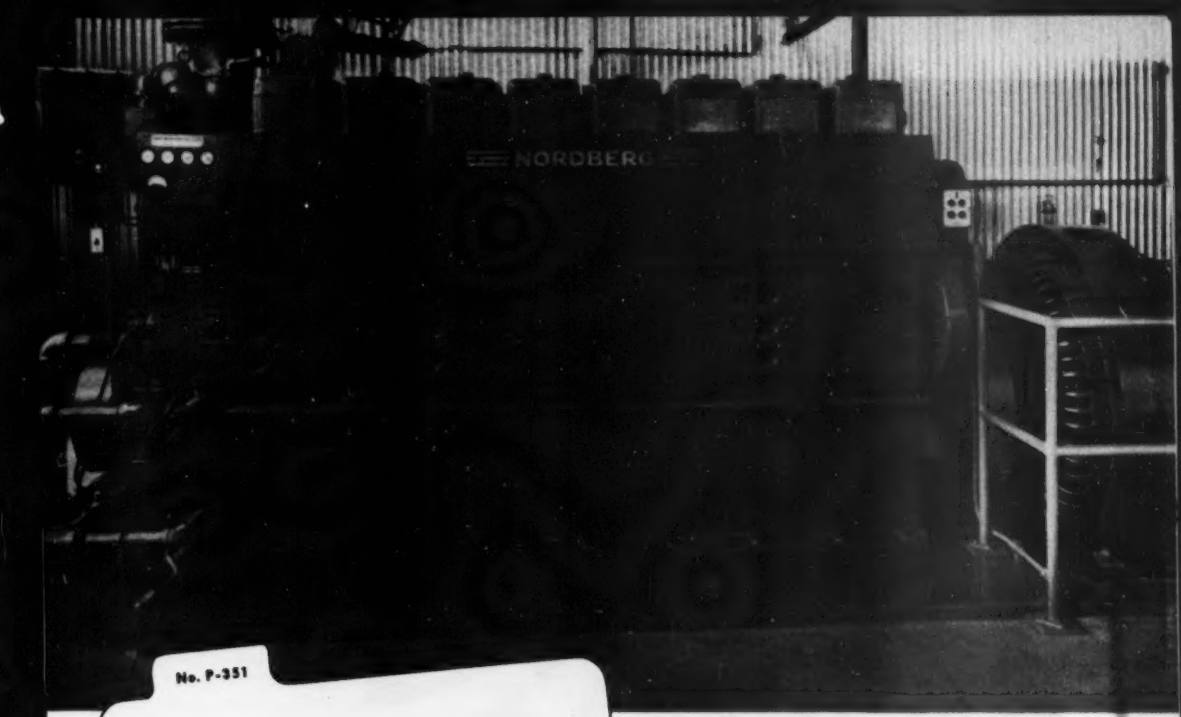
COLONIAL CREOSOTING COMPANY
GEORGIA CREOSOTING COMPANY
GENERAL SALES OFFICE — CHICAGO, ILLINOIS



No. P-351

THE CASE OF THE STAND-BY DIESEL that paid for itself in *FIVE MINUTES*

THIS 8-cylinder 720 hp Nordberg Supercharged and Intercooled Diesel is connected to a 500 kw AC generator for emergency power needs at the big Owens-Corning Fiberglas plant at Santa Clara, California.

With the process at this particular plant, an interruption of power for more than 5 minutes' duration could raise havoc with the processing machinery. To guard against any such shutdown caused by a failure of purchased power, the Nordberg Diesel is ready to take over the plant load at once. To make sure full power is instantly available, the engine is constantly maintained at operating temperature. Once each day the engine is started, paralleled with purchased power, and the plant load taken over for a short period . . . assuring its readiness, and familiarizing personnel with rapid operating procedure.

Since this installation was made, eight main power failures have occurred without warning. *In each case, the Nordberg stand-by unit was on the line and supplying emergency power within three minutes.* This service has more than saved the Diesel's original cost.

Here, then, is proved Nordberg Dependability . . . *Ready for instant service!*

NORDBERG MFG. CO.
Milwaukee 7, Wis.

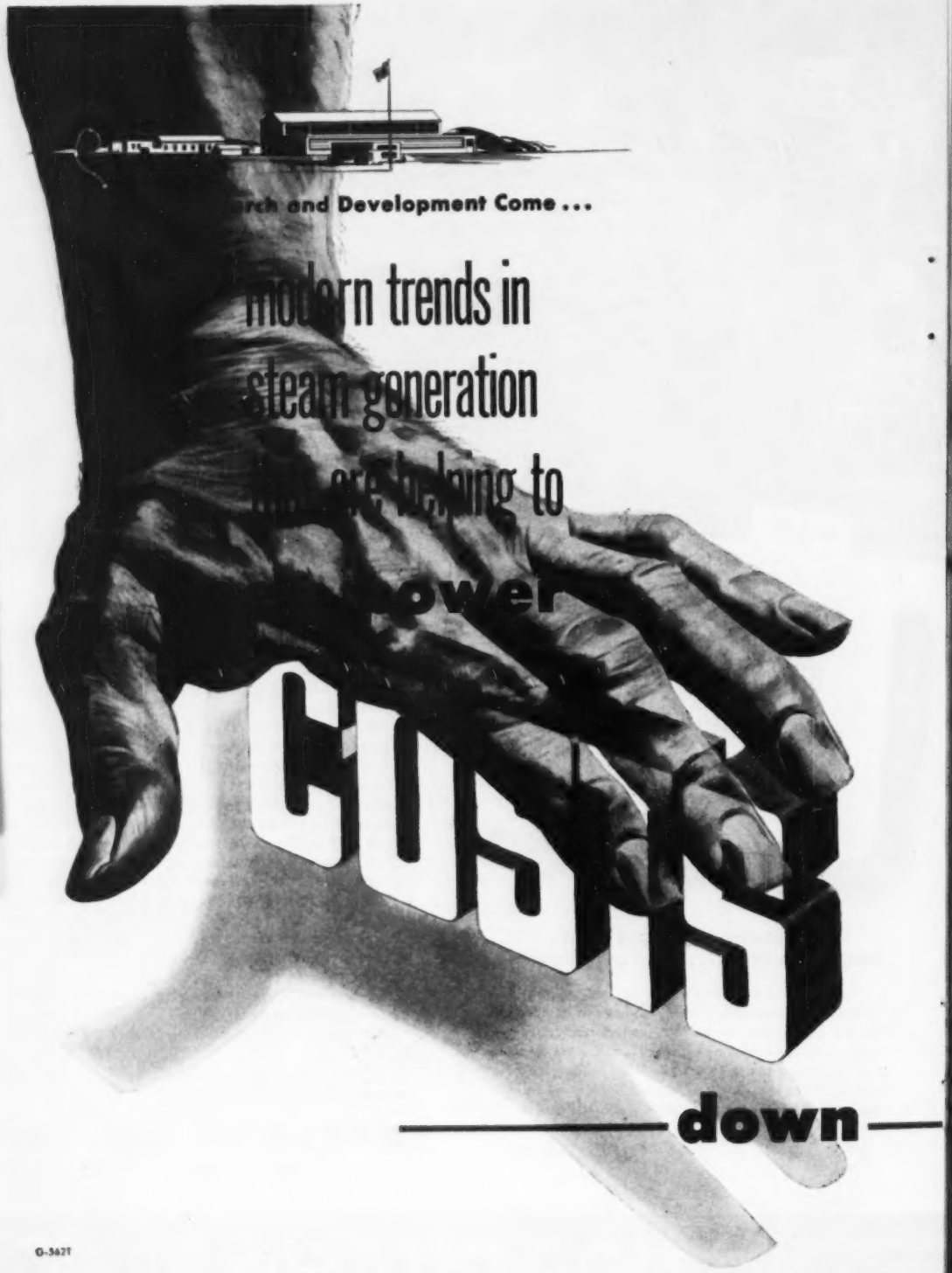
NORDBERG DIESELS FOR EVERY POWER REQUIREMENT . . . 10 TO OVER 10,000 H.P.

For regular or emergency service, you can't beat the advantages of Nordberg Diesels . . . they can be added to the line quickly, and can be held ready for instant service without exorbitant stand-by expense . . . and in the complete line of Nordberg two and four-cycle Diesel engines, including both oil and gas burning types, you will find exactly the right unit to meet your present and future power requirements.

P-351-R

BUSCH SULZER
A DIVISION OF NORDBERG

NORDBERG
DIESEL ENGINES


rch and Development Come . . .
modern trends in
steam generation
are helping to
ower
COSTS
down

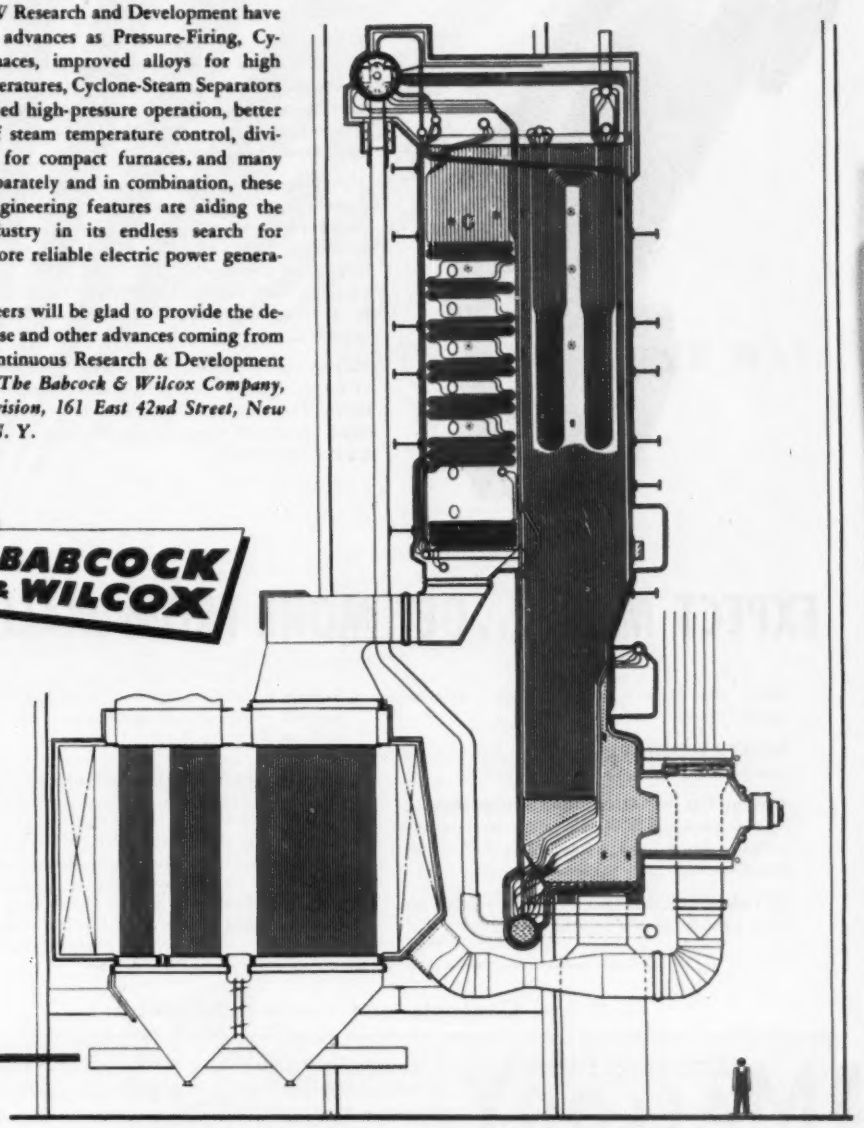
G-3621

In averaging 1.13 lb. of coal per kilowatt-hour during the past year, America's electric companies set a new record in their uninterrupted drive to hold down the cost of electric power generation. This continued, phenomenal, year-by-year record of progress has resulted from painstaking attention to the details of *all* equipment needed for the production of electricity. Of particular significance have been B&W developments in fuel-burning methods and steam generation. Many of these are included in today's most efficient stations having heat rates of less than 0.8 lb. of coal per kilowatt-hour.

From B&W Research and Development have come such advances as Pressure-Firing, Cyclone Furnaces, improved alloys for high steam temperatures, Cyclone-Steam Separators for simplified high-pressure operation, better methods of steam temperature control, division walls for compact furnaces, and many others. Separately and in combination, these modern engineering features are aiding the power industry in its endless search for cheaper, more reliable electric power generation.

Our engineers will be glad to provide the details on these and other advances coming from B&W's continuous Research & Development Program. *The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.*

BABCOCK & WILCOX



Pressure-Firing, Gas Recirculation, Cyclone Furnaces, High Pressure and Temperature with Reheat, and Cyclone Steam Separators are features of this B&W Radiant Boiler on order for a mid-west power company. Rated steam capacity—1,200,000 lb. per hr. Design pressure—2125 psi. Pressure at superheater outlet—1900 psi. Final steam temperature—1050F. Reheat to 1000F.

How Mallory Contact Assembly facilities can help you ...and cut costs

If you are now designing and manufacturing your own electrical contact assemblies, Mallory assembly engineering can simplify your production problems. Here's a typical example of how Mallory saves manufacturers time, trouble and money.

The components of this contact assembly for an aircraft power control unit formerly had to travel a complicated path between many suppliers. First, a copper blank was purchased from one source and sent to Mallory for brazing of the contact. Plate and braid, from another supplier, went with the brazed blank for assembly brazing in a fourth shop. A fifth supplier silver-plated the assembly.

Mallory now produces the complete assembly from start to finish. Quality is higher, and production costs are lower. The customer's problems of scheduling, reshipment, storage of components and divided responsibility are entirely eliminated.

EXPECT MORE...GET MORE FROM MALLORY

Here's what Mallory has to offer on your contact assembly work:

DESIGN EXPERIENCE . . . based on Mallory's engineering of more than 5000 types of contacts.

SPECIALIZED METALLURGICAL KNOWLEDGE . . . through consistent leadership in the development of powdered metals and special alloys for electrical contact service.

ADVANCED TECHNIQUES . . . for spot welding, brazing to provide full-area bonding of the contact to the backing material, and other specialized assembly methods which cut manufacturing costs and improve performance.

COMPLETE PRODUCTION FACILITIES . . . a recently expanded plant geared to high production and prompt delivery.

It will pay you to investigate Mallory assembly engineering, whether your contact assemblies are now in production or still on the drawing board. Write to us today.

In Canada, made and sold by Johnson Matthey and Mallory, Ltd., 110 Industry St., Toronto 15, Ontario

Electrical Contacts and Contact Assemblies

P R MALLORY & CO Inc

MALLORY

SERVING INDUSTRY WITH THESE PRODUCTS:

Electromechanical—Resistors • Switches • Television Tuners • Vibrators
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Metallurgical—Contacts • Special Metals and Ceramics • Welding Materials

P. R. MALLORY & CO., INC. INDIANAPOLIS 6, INDIANA

THE OLD WAY:
strong contrast
deep shadows

the
GUTH WYTE-LINER WAY:
low contrast
soft shadows

Here's a new idea in factory lighting to lift the eyestraining gloom off the ceiling:

ALL WHITE INSIDE—to reflect maximum light down and outward onto the working area.

ALL WHITE OUTSIDE—to reflect room light upward, brighten the ceiling and soften brightness contrast.

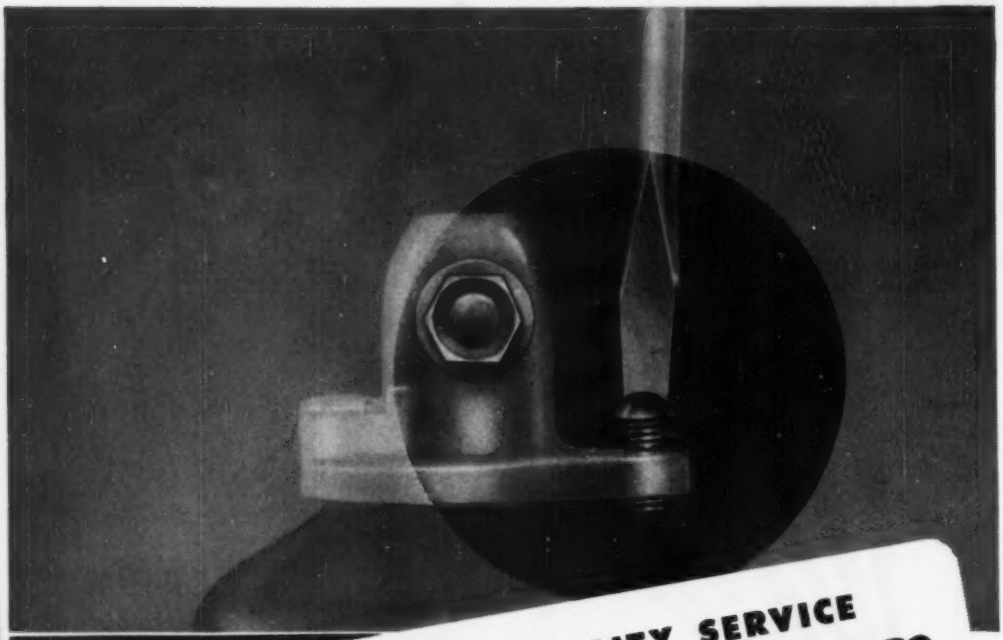
Easier to clean—reduces maintenance. Airflow Channel circulates air currents for longer ballast life.

GUTH Wyte-Liners are made in 2 and 3 lamp sizes for conventional 40-watt lamps and for 4- and 8-ft. Slimline. May we send you our 16-page Catalog 48-H with complete details?

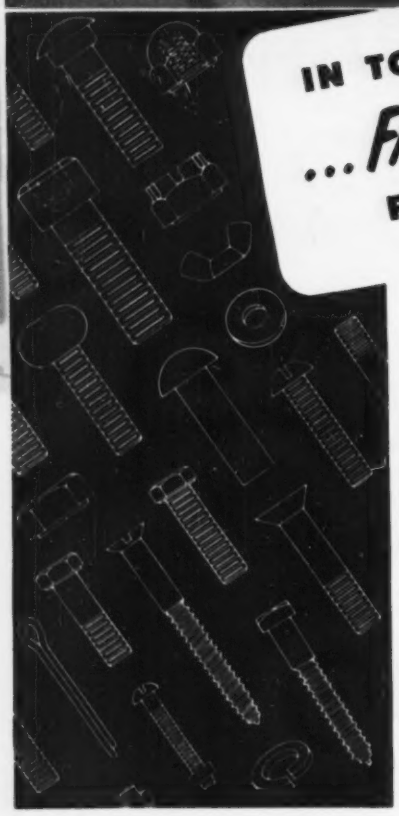
Guth LIGHTING

THE EDWIN F. GUTH COMPANY / ST. LOUIS 3, MISSOURI

Leaders in Lighting since 1902



IN TOUGH UTILITY SERVICE ... FASTENINGS by HARPER PREVENT CORROSION



Fastenings used by public utility companies must stand up under tough service conditions—in all kinds of weather.

Harper Everlasting Fastenings are designed to withstand these severe conditions and give years of trouble-free service.

In the complete Harper line there are more than 7,000 items. Here you will find bolts, nuts, screws, rivets, studs, washers, and cotter pins of all non-ferrous metals and all stainless steels.

Harper metallurgists and engineers will gladly assist you in the solution of any fastening problem you may be facing.

For better fastenings, call The H. M. Harper Company, 8205 Lehigh Avenue, Morton Grove, Illinois.

There is a Harper distributor near you with stocks of fastenings ready to fill your order. Call him for prompt service.

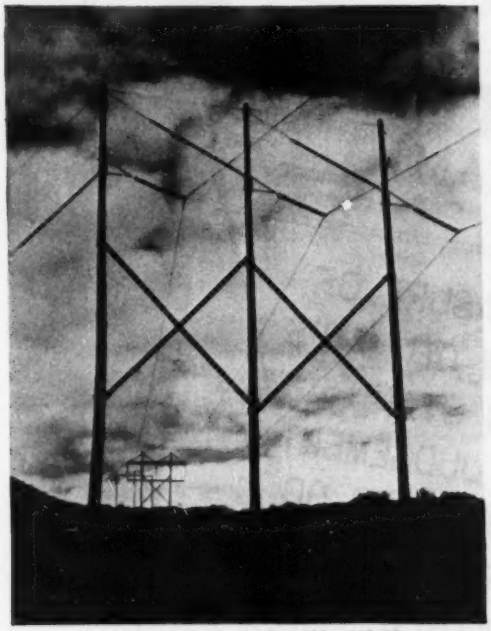
HARPER

EVERLASTING FASTENINGS

Specialists in all non-corrosive metals

Demand PROOF OF PERFORMANCE

for Superior Insulator Quality



Medium-angle structure of the 230-kv, 189-mile line of Idaho Power Company.

● Not long ago, Idaho Power Company built a 230-kv line extending 189 miles across southern Idaho. For this line, they wanted only the best of insulators.

RESULT: For use on their new line, The R. Thomas & Sons Co. was awarded a contract for 40,000 "*Quiet-Type*", 10-inch suspension insulators. Recently, 3000 more were purchased.

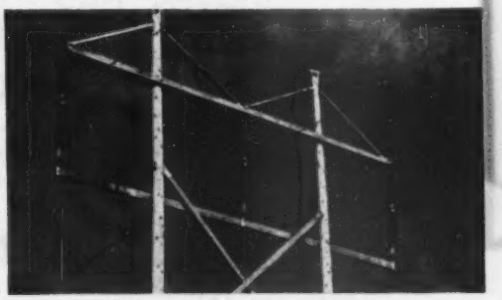
Thomas engineers pioneered the under-glaze process resulting in the radio noise-free porcelain insulator (Patent No. 2154387). Service records*, line and laboratory tests prove the superiority of "*Quiet-Types*" over conventional insulators.

After all is said . . . it's still quality that counts plus proper designing, precision manufacturing . . . and PROOF OF PERFORMANCE. Since the beginning of the Electrical Industry, Thomas has been supplying porcelain for the most difficult insulation problems. Why gamble?

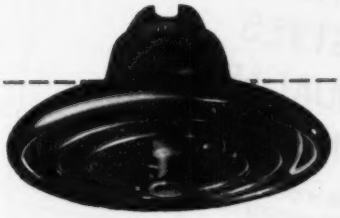
*Available upon request.

SPECIFY THOMAS INSULATORS—THE BEST BY LINE TEST

— Since 1873 —



230-kv hold-down structure designed by the Engineering and Planning department of Idaho Power Company.



The R. Thomas and Sons Co.

LISBON, OHIO

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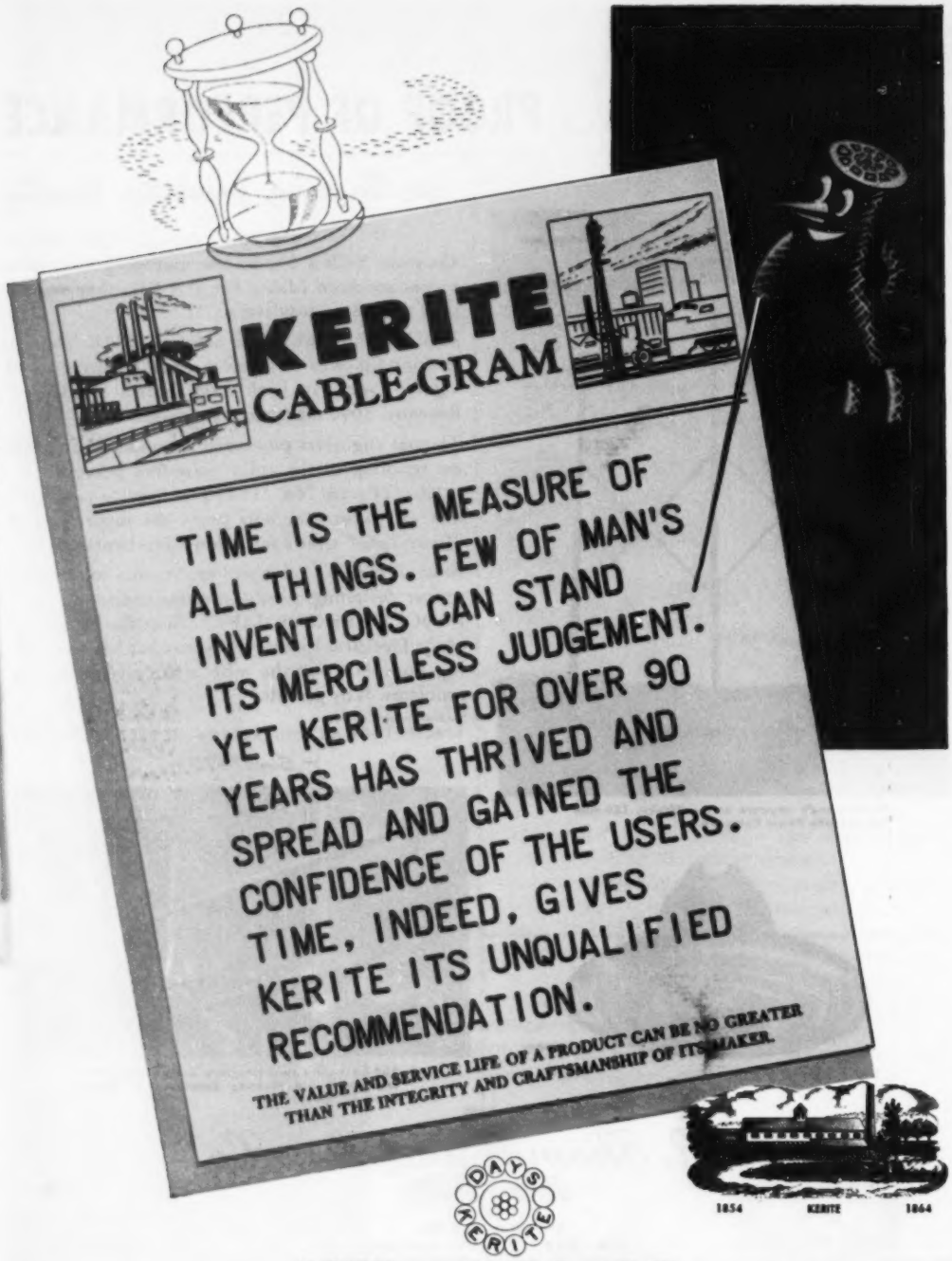
KERITE
CABLE-GRAM
TIME IS THE MEASURE OF ALL THINGS. FEW OF MAN'S INVENTIONS CAN STAND ITS MERCILESS JUDGEMENT. YET KERITE FOR OVER 90 YEARS HAS THRIVED AND SPREAD AND GAINED THE CONFIDENCE OF THE USERS. TIME, INDEED, GIVES KERITE ITS UNQUALIFIED RECOMMENDATION.
THE VALUE AND SERVICE LIFE OF A PRODUCT CAN BE NO GREATER THAN THE INTEGRITY AND CRAFTSMANSHIP OF ITS MAKER.
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THE KERITE COMPANY – 30 Church St., New York 7, N. Y.
Offices also at 122 Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.

A New EEI President Looks Ahead

Now is the time to look ahead. Now is the time to prepare long range programs not only for individual companies but also for the entire industry. Now is the time to recognize that cooperation with the federal government within the limits of long range interests of "the American Way" is the better part of wisdom.

To these proposals of Bayard L. England, newly elected president of the Edison Electric Institute, we subscribe wholeheartedly. We have every confidence in this young and able utility executive who is taking over the reins of the utilities' trade association at a strategic time in the history of the industry.

Having successfully survived under the restrictions of the Holding Company Act, during a major war, through a period of complex regulations brought on by mobilization, and having done so while under constant attack by those who would destroy free enterprise, the power companies stand on the threshold of a great new era of progress. With sound administrators in the past and a far-sighted leader for the future, EEI provides the anchor and the springboard for the industry's great tomorrow.

What are the plans of the new president? What are the goals he would have EEI reach in his year of office? These are the elements of his constructive program:

- A strengthening of the coordination of the work of the agencies rendering service to the industry.
- A continuation and expansion of the annual conferences of engineering and accounting groups of the institute so as to make them similar to the conference so successfully conducted for so many years by the commercial committees.
- Frequent progress reports by committee chairmen to the board of directors so that all will know exactly what the committees are accomplishing.
- Continuation of the conference of presidents of member companies.

Looking beyond the institute he offers these proposals for the industry's consideration:

- Close ties between companies and customers.
- Organization of a voluntary group of speakers supporting free enterprise.
- A resolute approach in the fight against the expansion of federal power, but
- Elimination of heated name calling.
- Continued adherence to facts and logic in answering federal power advocates.
- Uninterrupted and unceasing planning of system interconnections and their early completion.
- Recognition of the intelligence of the people when demonstrating to them the relative merits of private versus government enterprise.

These are the main points of the new president's program. These are the goals which he would like EEI and the industry to reach. They will reach them only if the new president gets the support that a man willing to sacrifice so much to serve the industry so wholeheartedly deserves.

Cheaper Than What?

Interior Secretary Chapman in a recent conference said that if the federal government developed Hells Canyon, the power rates "would be much cheaper than those of private companies that want to develop the Snake."

Cheaper than what? And how so?

When the federal power planners say "cheaper than" without any common denominator or basis of comparative charges or cost equalization, their rubber yardstick might well be calibrated for the planners' body temperature.

With "profit before taxes" the ground on which the planners usually attack the private companies, let us look at "prices before taxes." This might be a solid term to use for comparison of charges made by public power and privately owned electric systems.

The private company that wants to develop the Snake River is Idaho Power Co. Let's take a look at its 1951 annual report. It shows a total tax ratio of 31.7% of revenues. The aggregate electric sales price averaged about 9.65 mills per kwhr. This includes "large power" sales. On this generalized basis the "price before taxes" would be about 6.59 mills. The domestic customer price, with all its distribution cost elements, averaged 1.62¢. On the same basis the "price before taxes" would be a little over 1¢.

On the basis of the tax equality, not to mention cost allocations to various functions and other flexible factors such as ultimate cost over original estimates, how "much cheaper" would specially privileged Hells Canyon federal output then be than the output of the Idaho Power project?

And who fattens on this type of government monopoly power at the expense of millions of tax-paying citizens who are customers of tax-paying electric companies? Who else but the "special interests" profiting from the discriminatory clauses of the government contracts. These exclusive few are the political subdivisions, the government-owned or financed organizations in proprietary business enjoying special tax exemptions fed to them via the special privilege of tax-free power paid by tax-paying workers, farmers, and enterprise all over the country.

The industry must lose no opportunity to bring to these groups the fact that public power is cheap only to the few but expensive to the many who must pay the taxes to make possible the public power projects.

It Can Happen Here, Too

In Norway nearly 160,000 electric heaters were sold in 1950, almost 175,000 in 1951. Annual sale of heaters is sufficient to absorb the annual planned addition to the nation's generation capacity. So reports the Norwegian Information Service in its publication "News of Norway."

One of the main reasons for power shortage in Great Britain is the growing load of electric heating. It is estimated that the heating load in severe, cold weather amounts to 25 to 30% of the total demand.

In both of these countries, special conditions of one kind or another have great influence on the growth of electric heating. But they are still only secondary to the principal reason for that growth. It is that more and more people are discovering the amenities of electric heating—its convenience, cleanliness, safety, ease of control, and absence of bother.

We don't have the fuel shortage and other special conditions that are forcing the growth of electric heating in other countries. But we do have the basic reason—the desire of people for the better things of life. And quite possibly this desire will have a snowballing effect that will bring electric house heating along much faster than is generally expected.

Distribution Auxiliaries Lack Uniformity

There is both opportunity and occasion to do something about the uncoordinated ratings of arresters, reclosers, and fuse cutouts.

Distribution expulsion type lightning arresters and distribution circuit reclosers now have maximum interrupting ratings which are expressed in terms of available symmetrical rms amperes. But fuse cutouts have interrupting ratings which are expressed in total rms amperes, including the direct current component of the current or the off-set loop. This difference in the basis of rating devices, which are used on the same circuits, tends to create confusion.

It would seem desirable to have the various industry committees dealing with these devices take steps to establ a uniform basis for assigning maximum current interrupting ratings to these devices, including the lightning arresters, cutouts, reclosers and possibly the self-protecting type of transformers; also to have a common series of numbers chosen for the maximum interrupting ratings to be assigned to these devices for the sake of standardization.

In addition to the foregoing, it has been known for some time that the circuit X/R ratios and the recovery voltages have a very pronounced effect upon the current interrupting ability of these devices. At the present time the standards (whether they be AIEE or NEMA) do not contain definite specifications for the X/R ratios or the recovery voltages for the design tests.

Several of the industry committees have been making studies and have presented papers showing the recovery voltages and X/R ratios expected under service operating conditions. It therefore appears that the time is now right for the various industry committees who are charged with the responsibility of writing design standards to start putting down values for the X/R ratios and circuit recover voltages to be used in withstand tests. At the same time that this project is undertaken, it would appear advisable to make a review of the maximum voltage ratings assigned to these devices. These ratings should be based on the application requirements for the circuit operating voltages contained in the EEI-NEMA report on Preferred Apparatus Voltages, NEMA Publication No. 117, dated May 1949.

If these assignments were handled by joint apparatus committees, the value adopted could be more easily coordinated and kept on a uniform basis. Both the users and manufacturers of equipment should welcome these steps.

Point Out the Tax

Taxes paid by the Pacific Gas & Electric Co in 1951 amounted to $42.90 per customer, or about 22¢ out of every income dollar. The company is advertising this fact to acquaint all its customers and the general public in a personal way with the burden of taxes. The desired end of PG&E's message is to make each customer aware of the taxes it is paying for him. And in this election year, it is well to interest the customer in this problem.

THE ELECTRICAL WEEK

Featured in the News

England and Sammis are named to the top offices at Edison Electric Institute (p 96) . . . Atomic Energy Commission will need 4 million kw over a five-year period (p 97) . . . Reclamation celebrates official start of Columbia Basin irrigation project (p 98) . . . Court reserves decision in Consolidated Edison anti-smoke trial (p 100) . . . Washington Water Power Co has one more hurdle to clear to become an independent utility (p 102) . . . Senate restores $28 million in TVA funds lopped off by the House (p 104).

• • •

Latest from Washington—Hearings begin today on confirmation of Thomas C. Buchanan for reappointment to FPC . . . At same time, FPC begins hearings on applications of several natural gas pipeline companies to import gas from Canada to Pacific Northwest . . . Electric utilities have already placed orders for equipment which will bring in a total of 30.3 million kw by end of 1954, and this does not provide for the proposed new AEC load . . . Patent has been granted to E. G. Linder of RCA for a method of generating electrical energy from radioactive sources . . . After failing to receive a letter of acceptance, FPC has withdrawn a preliminary permit to French Broad Electric Membership Corp of Marshall, N. C., for a proposed 10,000-kw hydroelectric development. For similar reasons, FPC has dismissed a license application filed by Citizens Power Co of Lincoln, Neb., for a 9,000-kw project.

Depa details Kenneth S. Field, Ebasco Services, as acting chief of major equipment scheduling branch succeeding Guy T. Shoemaker, who is returning as vice president of Kansas City P&L . . . Depa is assigned to administer the CMP allotments for construction of electric utility service buildings. NPA formerly was responsible for this segment of the controls program . . . Export-Import Bank of Washington approves $41 million loan to seven electric companies in Brazil. They are subsidiaries of Brazilian EP, which is in turn a subsidiary of American & Foreign Power. Loan will bear 4½% interest and is to be repaid semi-annually over a 20-year period beginning in 1956. Funds will be used to purchase U. S. equipment and services for an expansion program which will cost $98 million.

If power encroachment in USBR activities keeps up, "irrigation will be merely an adjunct of the bureau," W. G. Sloan, former Bureau of Reclamation engineer and co-author of Pick-Sloan plan for development of Missouri River Basin, tells Idaho Reclamation Association Convention in Boise. He adds the bureau "has gone into the power business so heavily some top bureau officials forget there's anything else."

Illinois Power Association passes resolution urging the legislature to turn thumbs down on any proposed law that would place publicly owned utilities under jurisdiction of the Illinois Commerce Commission.

Boston Edison gets Massachusetts Department of Public Utilities approval to be exempt from zoning by-laws affecting construction of final link in 155-kv overhead transmission line to connect Waltham and Framingham. Much of line will occupy railroad right-of-way. The line will complete inner transmission loop around system.

Writing in June issue of Dun's Review, published by Dun & Bradstreet, Inc, Austin J. Tobin, executive director of Port of New York Authority, says good financial reporting is as necessary to successful marketing of bonds of a public corporation as it is in private financing. He states TVA makes "loud claims to being self-supporting and is widely acclaimed as such in most of the college textbooks on public administration." Yet, he adds, a large part of its capital costs are charged off to public service facilities and are not reflected at all in costs of power production.

Recent wage increases (some are subject to WSB approval): Potomac Electric Power, 11¢ per hour; Toledo Edison, 11¢ per hour; Philadelphia Electric, 7½%; Florida P&L, 10%; Wisconsin P&L, 5% with another 5% given last Jan. 1 voluntarily by Company; Houston Lighting & Power, 10%, and Los Angeles Dept of Water & Power, 4.6%.

From East South Central—Paducah, Ky., Board of City Commissioners has decided to give citizens opportunity to vote on buying the local distribution system of Kentucky Utilities Co and the issuance of $3.4 million in revenue bonds to cover the purchase . . . Court of Appeals rules City of Middleboro, Ky., must try to buy the plant of Kentucky Utilities Co before building its own distribution system.

From South Atlantic—Belhaven, N. C., Board of Aldermen votes to sign a contract with Virginia E&P for purchase of electric power and will abandon its power supply.

Rates—Cambridge and Hurlock, Md., initiate action to oppose 10% increase in rates by Eastern Shore PS . . . Belton L&P asks South Carolina PSC approval to up rates by 4% . . . Duke Power Co files petition with North Carolina PUC asking for rehearing of recent PUC order granting the company about $2 million rate increase. Previously Attorney General Harry McMullan had filed a petition for rehearing, asserting that the order was erroneous, unlawful, and unreasonable.

New Bedford, Mass., mayor is advocating legislation to authorize the city to acquire the New Bedford Gas & Edison Light Co, which is seeking a rate hike.

Congratulations—Indianapolis P&L designates Wallace O. Lee as senior vice president and promotes Bernard W. Schotters to new office of vice president and secretary . . . Harold H. Scaff, vice president of Ebasco Services, is elected president of New York City Control of the Controllers Institute.

WASHINGTON COMMENT

JESSE MOCK

A taunting question faces the federal power advocates who ran the Electric Consumers Conference in Washington last month: Do they really want an investigation of the electric utility industry or shall they be content merely to threaten an investigation?

In this election year, they must decide on the answer that has the most political appeal. If they fumble this one, they stand to lose some of the "Political Pull" they now claim.

First note that no responsible official, either within the federal government or outside, has called directly for an overall investigation of the nation's electric companies. On the surface, at least, they have no great argument against the tremendous expansion program the companies are now undertaking in the interest of national defense. They argue about rates but call for no investigation of the regulatory agencies which fix these rates.

These critics avoid comparing the services of the electric companies with those of public agencies in the power business. On a nationwide basis, such a probe might turn up some interesting information.

But delegates to the conference confined their demand for an investigation to this language:

"There must be immediately established at every level of private utility operation a thorough and continuing investigation of all expenditures of money by power monopolies for propaganda, lobbying, political activity, or corruption of public servants or institutions."

Strong Demand but No Action . . . With this strong demand, it would certainly appear that at least one of the half dozen Congressmen who addressed the conference would have immediately offered a resolution for an investigation. But two weeks after the conference there still was no formal action in either House of Congress.

And President Truman's off-the-cuff remark that he might have the Justice Department take a look at advertising expenditures of electric companies turned out to be a flub on his part.

Just what is the purpose of the investigation proposed by the federal power advocates? Do they seek to stifle free speech of one segment of American business? If so, they may be attacking a basic civil right highly regarded by the citizens of the nation.

Are they really concerned about the almost imperceptible amount added to the customers' bill by the modest advertising program of the electric companies? If so, an investigation might point up the fact that each of these customers is paying a much higher assessment for federal power projects that can never benefit him.

Is the electric company publicity program really effective enough to worry the federal power planners? This might be partly why their wrath is so great.

But the best guess in Washington is that the federal power advocates see their demand for an investigation as highly potent campaign-year talk. There are a number of men in the public power movement that would much prefer to avoid an open investigation of the power company advertising and lobbying expenditures this year.

Facts Would Spoil Campaign Oratory . . . They can see no sense to letting established facts get in the way of what otherwise will make some excellent campaign oratory. An investigation might produce the facts that would undermine the attack which the federal power lobbyists are leveling at electric companies.

Then there are some technical reasons why the proposed investigation would produce little fodder for the federal power advocates. First, most lawmakers are more interested in doing some home-state campaigning than in conducting an investigation in Washington this summer. Second, campaign developments might easily steal headlines from an investigation.

But the most important consideration is that an investigation might turn out to be a much less effective political stunt than the mere demand for an investigation.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Multiple street lighting is growing but nothing has been done about creating a standard socket for the lamps.

Festooned "weatherproof" is now being removed from service wires by a spinner rig that also applies a new wrap of adhesive tape.

Oil from low temperature carbonization of cannel coal yields up to 50 or more gallons per ton.

Oil-bearing shale in Ohio appears in large beds 200 to 600 feet thick; yields 3 to 10 gallons per ton. Byproducts will help share the cost of extracting the oil.

Oil shales carry no oil as such. Kerogen is the content which yields oil when subjected to destructive distillation.

Steam from volcanic fumaroles in the Lardarello region of Italy is emitted at from 90 to 390 psi and 290 to 400 F. It is mixed with large volume of non-condensible gases. Wells driven are 1,000 to 2,000 feet deep; 140 produce about 4,400,000 pounds per hour.

Silicone rubbers can be bonded to steel with a grip that is stronger than the rubber itself.

Water pumping for air conditioning is lowering the water table under Louisville by 2 ft each year.

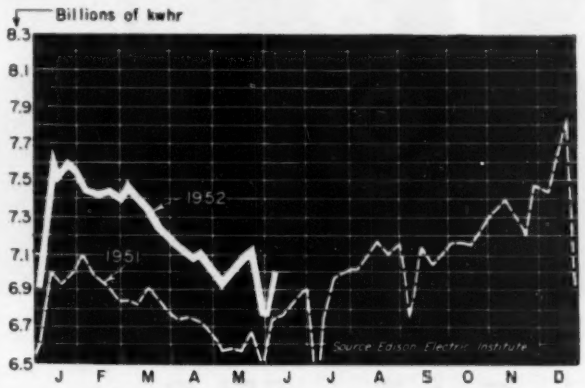
Hydrogenation of coal to produce 10,000 barrels of oil will require about 6 million gallons of water. To meet present annual demands would use triple the water.

Demineralization of industrial water by means of resinous ion exchangers is on the increase.

Runner buckets for Francis turbines are difficult to cast as a whole. They are now being cast individually at lower overall cost and then welded to the crown and band.

Engineers viewing retirement are prone to become increasingly cautious in design—"why barge in with departures at this late date." Remedy for progress—let youth supply the zeal and the calculated risks of courageous innovations.

STATISTICS



Output Week Ended June 7—7,005,066,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
June 7	+4.0	+2.2	+1.9	−2.2	+3.3	+13.1	+6.9	+7.0	+4.0	+6.5
May 31	+5.7	+3.6	+3.9	+2.8	+5.0	+14.0	+7.5	+6.4	+2.9	+8.3
May 24	+7.4	+1.6	+4.0	+6.6	+6.0	+15.7	+7.4	+7.7	+4.9	+7.3

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Loads (Million Kw)	Mar.	66.5*	66.9	61.4
Capacity (Million Kw)	Apr.	76.74	76.34	70.90
Production (Billion Kwhr)	Apr.	31.51	33.04	29.29
Hydro		9.96	10.44	9.01
Fuel		21.55	22.60	20.28
Fuel Consumption				
Coal (Million Tons)	Apr.	8.05	8.84	7.88
Oil (Million Barrels)		4.20	5.22	4.81
Gas (Billion Cu Ft)		66.50	57.39	58.84
Sales (Billion Kwhr)	Mar.	29.03	29.08	26.77
Residential		8.32	8.51	7.35
Commercial		4.85	4.87	4.44
Industrial		13.98	13.82	13.12
Other		1.87	1.88	1.86
Net Income Class A & B Companies ($ Million)	Mar.	82.65	88.00	71.10
Estimated Dec. 52 Peak (Million Kw)	Mar.	80.4	80.5	78.2
Kwhr per Residential Customer (12 Month Average)	Feb.	2,037	2,021	1,867
Revenue per Kwhr Residential Service (12 Month Average)	Feb.	2.80¢	2.81¢	2.86¢
Canadian Production (Billion Kwhr)	Mar.	5.22	4.97	4.91

Business Statistics

FRB Industrial Production Index†††	Apr.	214*	217	222
Gross National Product Annual Rate ($ Billion)	1st Qtr.	339.0*	334.6	319.5
E. W. 5 Industry Production Index	Apr.	124.0*	123.8	122.6
ENR Construction Cost Index††	May	116.8	116.2	113.6
BLS Consumer's Price Index	Apr.	188.7	188.0	184.6
NEMA Insulation Materials, Sales Index†	Mar.	536	528	662
NEMA Electric Appliance Sales Index†	Mar.	278	224	422
NEMA Household Refrig. Sales Index†	Mar.	163	153	330
Metal Prices (June 9)				
Copper, Conn. V., lb		$ .24½	$ .24½	$ .24½
Lead, N. Y., lb		.15	.19	.17
Zinc, prime Western E. St. Louis, lb		.16	.19	.17½
Tin, Straits, qual. N. Y., lb		1.21½	1.21½	1.29
Aluminum, ingot, base price		.19	.19	.19
Nickel, base price		.56½	.56½	.56½
Steel, billets, Pitts., ton		56.00	56.00	56.00
Steel, scrap, No. 1 heavy, Pitts., ton		45.00	45.00	45.00

* Estimated. † 1936=100 †† 1949=100 ††† 1937-39=100 (Unadjusted)

Electrical Equipment Prices Declining

Prices of electrical machinery and equipment in the nation's primary markets during March were slightly below those prevailing at the beginning of 1951.

Bureau of Labor Statistics wholesale price index for electrical equipment and machinery stood at 121.3 for April, indicating that prices were 21.3% higher than the 1947-49 average. But they are 0.7% below those paid in July 1951, highest since World War II.

Indexes of products priced to obtain the electrical machinery and equipment index show that the cost of integrating instruments is 18.5% higher than the 1947-49 average, motors and generators 22.3%, transformers and regulators 16.8%, switchgear and fuses 28.6% higher.

The wholesale price index is designed to show the general rate and direction of the composite of price movements in primary markets, and directions of price movements for individual commodities.

It is designed to measure "real" price changes between two periods of time, i.e., price changes not influenced by changes in quality, quantity, terms of sale, etc.

Wholesale Prices (1947-49 = 100)

	Apr. 1952	Apr. 1951	Apr. 1950
Electrical Machinery & Equipment	121.3	121.8	100.5
Integrating Instruments	118.5	121.3	102.0
Motors & Generators	122.3	121.8	100.9
Transformers & Regulators	116.8	116.8	97.1
Switchgear & Fuses	128.6	131.7	103.5
Arc Welding Equipment & Supplies	119.8	119.0	102.8
Batteries	113.3	109.3	94.3

During the year ending in April the prices of integrating instruments fell 2.3%. Prices of switchgear and fuses 2.4%.

During this same period prices of motors and generators increased slightly, those of transformers and regulators, arc welding equipment and supplies held steady. Batteries showed the largest increase, 3.7%.

Immediately after the outbreak of the Korean conflict prices of electrical machinery and equipment rose sharply, over 20% in one year. Switchgear and fuse prices which showed the largest increase during the year ending April 1951, 27.2%, have shown the greatest decline since that time.

RETIRING PRESIDENT George M. Godsby, left, congratulates Bayard L. England, president of Atlantic City Electric Co, new EEI head

PHILIP D. REED, chairman of the board of General Electric, presents Coffin Award to James B. Black, right, Pacific G & E president

England, Sammis Get Top EEI Posts

Directors name A. B. Morgan secretary in surprise move; select H. S. Sutton as treasurer. Prize awards are made

Edison Electric Institute's 20th annual Convention in Cleveland wound up with the election of Bayard L. England, head of Atlantic City Electric Co, as president for the coming year. (See Contents Page)

Walter H. Sammis, president of Ohio Edison Co, succeeded him as vice president.

In a surprise move, the directors selected A. B. Morgan, Institute's assistant managing director, as secretary. He will serve in both posts for the next 12 months, an EEI spokesman said last week.

Named as treasurer was H. S. Sutton, treasurer of Consolidated Edison Co of New York.

Addresses given at the meeting are abstracted in this issue beginning on Page 105.

Highlights of the convention, aside from the talks, were the presentations of a number of prize awards. Pacific Gas & Electric Co carried off the industry's top honor, the Coffin Award, for its success in meeting the challenge of skyrocketing electric power demand in postwar California (EW, June 9, p 7).

The Claude L. Matthews Valor Award went to 23 employees of Union Electric Co of Missouri for "extraordinary courage and resourcefulness" in maintaining electric service across swift-running Missouri River flood waters.

The award is made annually to honor acts of devotion to duty in maintaining or restoring important electric service. It was established by and named for the president of W. N. Matthews Corp, St. Louis.

The 1951 award citation gave this account of the acts of valor honored:

During the Missouri floods last July, St. Charles, Mo., a community of 20,000, was in imminent danger of having its vital services disrupted by destruction of a high-voltage power line.

Under conditions complicated by deep water and treacherous currents, the linemen, groundmen, truck driver operators, foremen and an engineer cited worked steadily for 36 hours to prevent a disruption. According to the citation they repeatedly performed tasks that involved great danger of serious injury or drowning and succeeded in building a by-pass power line, assuring the city's supply of power.

Union Electric men honored were: R. C. Babka, Hobert Biermann, Milton Bruns, Carl Classen, I. L. Ditch, K. D. Dolde, E. W. Fahrenhorst, J. W. Gilbert, E. J. Giltner, J. A. Jobe, Chester Keller, H. M. McGuire, J. F. Miklovic, D. A. Neumann, H. D. Rilling, J. H. Rose, R. J. Shillito, A. R. Smith, W. R. Sorby, F. J. Spitznagel, S. S. Starr, D. D. Walkenhorst, and L. J. Watts.

The Reddy Kilowatt Annual Report Award went to Pennsylvania Power & Light Co. The company's report, the judges decided, "best illustrates, humanizes and simplified" company operations. They commended PP&L for presenting a "picture of an American industry" and its development through invested savings of many persons.

Four electric companies received honorable mention certificates. They were Union Electric (more than 400,000 customers); New York State Electric & Gas Corp (200,000-400,000 customers); Wisconsin Power & Light Co, last year's winner (100,000-200,000 customers); and Nova Scotia Light & Power Co, Ltd, (less than 100,000 customers).

Contest judges were Fischer S. Black, editor, Electrical World; Merryle S. Rukeyser, financial writer; Tom P. Walker, vice president, Irving Trust Co; and Harold N. Young, partner, Eastman, Dillon & Co.

George E. Whitwell, who made the Matthews and Reddy Kilowatt Award presentations, announced a new award to be presented under the auspices of EEI.

It is the "More Power to America Award," for the electric utility company that does the most to foster industrial electrification during each contest year.

The award is sponsored by the General Electric Co. First presentation will be made by EEI at its 19th Annual Sales Conference in Chicago, April 1, 1953.

AEC Will Require 4 Million Kw

Commission needs additional power over five-year period to meet demands of $4.2 billion expansion program

Atomic Energy Commission's $4.2 billion expansion program, of which $3.3 has been requested, will require something in the neighborhood of an additional 4 million kw of electric power capacity.

This capacity would be added over the next four to five years to supply the means for production of fissionable material, and to a much lesser extent for turning these materials into atomic weapons.

Diffusion Plant . . . Of the $4.2 expansion, AEC thus far has indicated specifically how it proposes to spend only $1 billion. This would be used for construction of a gaseous diffusion plant somewhere in the Ohio Valley. Approximately 1.8 million kw would be needed for this facility and AEC is now considering the offer of a group of electric companies to finance, construct, and operate the power plant for this proposed facility.

Although the remainder of the commission's planned expansion is still under wraps, informed sources say the major portion will be at two present AEC installations—Oak Ridge, Tenn., and Paducah, Ky.

Power for both these installations is now supplied partially by the Tennesee Valley Authority. A private corporation, Electric Energy, Inc, will share the load of the Paducah plant when if finally goes into production.

It is expected that planned expansion at Oak Ridge will increase electric power requirement by at least 750,000 kw, and planned expansion at Paducah will require added capacity of approximately 1.2 million kw.

Request for TVA . . . Included in the $3.3 billion request now being considered by Congress is a $150-million request for TVA. This would mean the authority could add enough capacity to take care of the proposed expansion at Oak Ridge.

Whether AEC now is considering purchasing additional power for the Paducah operation from electric companies, EEI, or eventually from TVA will not be known until its expansion budget is made public.

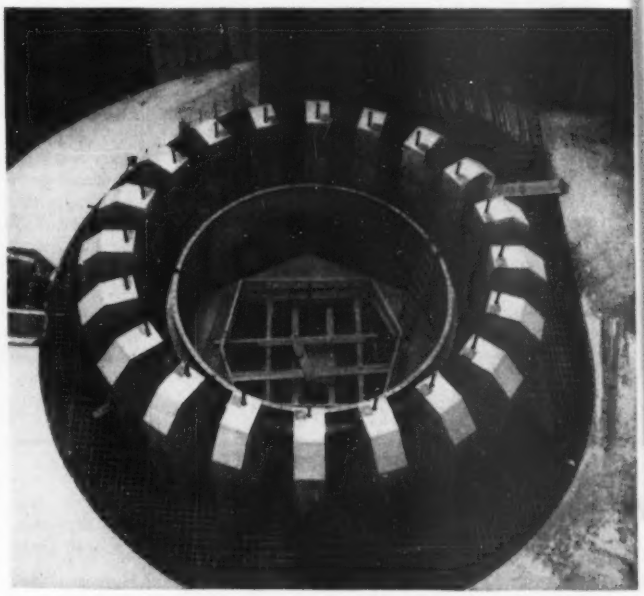
There is the possibility that several atomic weapon assembly plants will be located in different parts of the country. Information now available indicates the major expansion, especially as it affects electric power requirements, will be at the proposed Ohio Valley installation, Oak Ridge, and Paducah.

Lighting Manufacturers Fined in Antitrust Case

Fines have been imposed on four leading manufacturers of street lighting equipment and six of their officers and directors in a criminal antitrust case decided recently in Federal District Court, Cleveland.

General Electric Co, Westinghouse Electric Corp and Union Metal Manufacturing Co, Canton, Ohio, were fined $15,000 each and Pacific Union Metal Co, Los Angeles, $3,000. The indictment charged the defendants excluded others from the opportunity to compete in the street lighting business and agreed to eliminate competition among themselves.

A consent judgment was entered at the same time in a companion civil antitrust case against the defendants and Holophane Co, Inc, of New York, terminating the illegal practices and containing safeguards against their renewal. The civil judgment prohibits exclusive distribution agreements and forbids any future agreement fixing prices, allocating customers, acquiring competitors, submitting collusive bids.



Groundwork for McNary Dam Turbine

The circle of stone slabs shown above will support housing for a turbine which will turn the driveshaft of a 70,000-kw generator at McNary Dam on the Columbia River in Washington. Inside the stone piers is the draft tube liner.

Erection piers are required to hold in place the steel draft tube liner and support other parts of the turbine assembly during erection and placing of concrete, which ultimately will encase the piers.

The centerline of the turbine blades will be about halfway between the top of the steel liner shown in the picture and the top of the erection piers.

The generator floor will be approximately 56 ft above the top of the piers.

The McNary project, when completed in 1956, will have 14 70,000-kw units.

USBR celebrated . . . people gave thanks . . .

A celebration lasting 11 days and involving eight communities in a 600-sq mi area marked a shift in emphasis this month on the Bureau of Reclamation's Columbia Basin Project from power to irrigation.

In the picture at left above, Sally Johnson, queen of the Grand Coulee Water Festival in Washington, held the tape while Under Secretary of Interior Richard D. Searles used the shears to open a "Little World's Fair" in Ephrata. Foreign representatives from 20 countries where reclamation is practiced looked on.

At right above, the dry hills of the Columbia Basin are visible across Soap Lake at one of two outdoor religious observances held at the site of a "Grand Coulee Cavalcade".

Aerial view of Grand Coulee dam at right shows 12 large pipes leading from pumps into the storage reservoir in the background.

Some water from the huge irrigation project was supplied intermittently to farmers last year as 65,000-hp pumps began filling the Grand Coulee equalizing reservoir (EW, June 25, 1951, p 6). But May 29, 1952, was set for the symbolic delivery of the first irrigation water to a special tract near Moses Lake as a feature of the water festival.

Although Reclamation now puts its emphasis on irrigation in the Columbia Basin, power will pay much of the bill for the $702.5 million project. Construction costs attributable to commercial power total only $158 million as compared to $483 million for irrigation, but commercial power sales are expected to repay more than 75% of the total. The remainder will be repaid to the U. S. Treasury by the settlers.

Grand Coulee's power facilities are 96% complete, but work on irrigation facilities, now only 38% complete, will continue for years. Power-subsidized irrigation in the basin is expected to make possible on agricultural development producing crops valued at $60 million annually by the early 1960's. Development of the first 500,000 acres is expected to result in 6,500 new farms and 95,000 more people by 1960.

Material Quotas . . .

. . . for fourth quarter held up pending steel strike decision; outlook hopeful

Government control agencies have held up issuance of fourth quarter material allotments awaiting outcome of the steel strike.

Prolonged shutdown of the mills would require a reshuffling of steel allotments and possibly drastic cutback of materials assigned to less essential production. No official was prepared to say definitely how the strike would affect manufacture of electrical equipment, but it was assumed that electric power expansion would have priority over civilian goods production.

Outlook Hopeful . . . Proposed fourth quarter allotments to electric equipment manufacturers and electric utilities were reported to "look good" to some government officials administering the materials program. Barring a long steel strike, it is expected that the power program may keep pretty much on schedule for the next year.

But some soft spots are beginning to show up:

- Alloy piping is hard to get, and two utilities report slippages of up to six months in delivery of orders of this item for major plant additions.
- Heavy structural steel alloy pressure tubing, and stainless steel for turbines are still in tight supply.

Switchgear Survey . . . Defense Electric Power Administration is making a survey of switchgear requirements as a possible guide in deciding whether more production capacity is needed for this equipment.

On the other hand, utilities are apparently having much less trouble cashing their CMP tickets than three months ago. Depa's construction and expediting branch is getting fewer calls for help.

. . . as Grand Coulee pumped water on the land

Atomic Research . . .

. . . on industrial use of energy should be exchanged more freely, Canadian asserts

The director of the Canadian atomic research program has called for more complete exchange of knowledge between his country and the United States in the use of fissionable materials, especially where that knowledge applies to industrial use.

Dr Chalmers J. Mackenzie, head of Canada's Atomic Energy Control Board, recently told the National Industrial Conference Board in New York that the future for industrial use of atomic energy was bright, but such use must be developed by private industry once the threat of war is no longer a major consideration.

He pointed out that Canada had confined itself to research on nonmilitary use of atomic energy since 1945.

"I realize full well," he said, "that our research effort is small in comparison with the almost astronomical activities of your Atomic Energy Commission. The greater part of their findings, however, are classified and not available to us and it may well be that my views would even today be modified materially if I was aware of all their scientific facts."

AEC Reply . . . Queried in Washington, a spokesman for the U. S. Atomic Energy Commission said interchange of information with Canada is on a limited scale, but is expected to expand now that one of the barriers has been lowered. This was brought about by an amendment to the Atomic Energy Act approved by Congress early this year.

The amendment prescribes a procedure by which secret atomic energy information may be exchanged with friendly countries.

At least one interchange of classified information with Canada has been completed this year, without aid of the amendment.

Ruling Put Off in Smoke Case

Consolidated Edison contends New York's regulations are unconstitutional at trial in Magistrates Court

In a trial marked by heated argument on the definition of smoke, Consolidated Edison Co of New York last week asked for dismissal of charges that it violated New York City's smoke regulations on the grounds that the regulations were unconstitutional.

The company contended a literal interpretation of the regulations would make it impossible for utilities to operate.

The judge reserved decision in the case, involving emissions from the company's East River Plant in Manhattan, until July 18.

Three Cases . . . The case is one of three brought against the utility by the Bureau of Smoke Control on charges that several Con Ed power plants have been emitting dense smoke. The other two cases involve emissions from the Hell Gate Plant in the Bronx and the Hudson Avenue Plant in Brooklyn. The Hell Gate Plant case went to trial last week.

At the Manhattan trial in Magistrates Court, bureau inspectors testified that as far back as Aug. 2 and also on Oct. 25 and 26 dense smoke was emitted from the second of the East River Plant's three stacks. They contended the smoke was almost black and they could not see through it.

Con Ed's Defense . . . Counsel for Con Ed presented their case June 5 and 6. The defense contended:

- Smoke in the common meaning of the word was not emitted.
- Any emissions from Con Ed stacks were unavoidable.
- Con Ed has done everything possible to curb emissions from its plants to comply with Smoke Control Law that went into effect Oct. 1, 1950.

Of prime importance in the case was the definition of smoke. According to the Smoke Control Bureau's definition any emission from a stack is smoke. Con Ed, through its only witness, Gordon R. Milne, mechanical engineer for the company since 1948, contended the visible elements of smoke are steam, flyash, and carbon.

(Flyash is defined in the bureau's regulations as dust. The charges against Consolidated Edison did not involve a violation of flyash rules.)

No Carbon . . . Milne explained that carbon by itself is not emitted from Con Ed stacks since this is impossible with the burning of pulverized coal. Only carbon emitted, he said, is entrained in the flyash and therefore a part of the flyash. He also testified that coal cannot be burned without giving off steam and there was no known mechanical device for preventing the emission of steam. Milne said steam has the appearance of black smoke when it is in a shadow and is also colored by flyash.

On the basis of this testimony, counsel for Con Ed contended the city's smoke regulations were unconstitutional since by their definition steam would constitute smoke. This, they said, would make it impossible for utilities to operate, since their plants must emit steam.

Counter Claim . . . The city countered that the carbon content of the flyash is increased and particles of carbon alone are emitted during periods of improper firing or at times when the boilers are being overloaded.

Con Ed replied it never overloaded its boilers but did push them to the full limit of their capacity when load requirements demanded it. A jump in load, the utility contended, constituted an emergency situation.

In this connection, counsel for the company made reference to a case involving a Cunard Line steamship which emitted dense smoke when forced to increase engine revolutions suddenly to buck a tide. The company was acquitted of violating smoke regulations on the grounds that an emergency situation existed and the emission was unavoidable.

Improvement Plans . . . During the trial Consolidated Edison emphasized its efforts to install more efficient dust collecting equipment at the East River plant. The plans, formulated in 1948, were hampered by material shortages brought about by the Korean war.

The city asserted the equipment could have been ordered before materials got scarce.

Calculating Superintendent

Wisconsin Michigan Power Co well might claim it has the most calculating employee in the utility business. The company's superintendent of construction L. W. Wyss, shown above with his gadgets, has made a collection of more than 200 slide rules and calculators over the past five years.

Ford Museum Visits Ohio Edison

Part of the Henry Ford Museum at Greenfield Village in Dearborn, Mich., has been sent on a nation-wide tour of all cities over 100,000 population. For the most part local electric utilities have been asked to sponsor the exhibit as a community relations project. Here Walter H. Sammis, left, president of Ohio Edison Co and newly elected vice president of the Edison Electric Institute, and Harvey Firestone, Jr, chairman of the Firestone Tire & Rubber Co, view one of the 20 displays. Ohio Edison was the first utility in the nation to sponsor the exhibit. During its week-long stay over 10,000 persons visited the company's auditorium where it was housed.

PUAA Lists Officers and Their Assignments

The Public Utilities Advertising Association has announced its complete list of officers and the directors of its service activities.

Paul L. Penfield, Detroit Edison, is president (EW, May 12, p 29).

Walter G. Heren, Union Electric Co of Missouri, first vice president, will be in charge of the convention at St. Louis in May 1953.

C. Fred Westin, Public Service Electric & Gas, Newark, second vice president, will have charge of the eight regional meetings. He will also be liaison with the Edison Electric Institute and the American Gas Association.

Charles D. Lyon, Potomac Edison, Co, third vice president, will be in charge of membership and publicity.

George G. Hanel, Connecticut Light & Power Co, will continue as secretary, and Mead Schenck, Interstate Power Co, as treasurer.

Richard D. Furber, Northern States Power Co, will be chairman, Advertising Exchange Service; George W. Kindon, Philadelphia Electric Co, will be editor of the "PUAA Bulletin;" and Fenton Kelsey, Jr, Electrical Information Publications, will be chairman of the 1953 Better Copy Contest.

Why a Utility Backs Co-ops after U. S. Power

Northern States Power Co is explaining to the people of Minnesota its reasons for supporting 20 rural electric cooperatives in their efforts to get power from two federal power projects. The co-ops have been trying to get the federal government to build transmission lines into the state from Garrison Dam in North Dakota and Fort Randall Dam in South Dakota. Both are on the Missouri River. So far the co-ops have been unsuccessful.

In one page newspaper advertisements Northern States has given the following reasons for supporting the co-ops:

1. Power will be generated at the dams.
2. Some of this power will be available for Minnesota.
3. The co-ops are "preferred customers" for this power.
4. Work is now underway on the initial segments of the loop of transmission lines needed to bring this power into the state.

The company also explains that it is interested in promoting the welfare of the area.

AD COPY THEMES

Interstate Glass Co, Omaha, Neb.—"We thank God!! for mercifully sparing many cities, towns, and farms from the ravages of flooding rivers. This may be our last chance to avoid an extensive and sorrowful exodus from the most productive valleys in the world. Stop bureaucratic groups from using our lives and property as pawns in their schemes to turn our rivers into power plants to further their plans to socialize all industry."

This was the copy of the top third of a full-page newspaper ad appealing to the people to write to all government officials insisting that flood control and irrigation and not power production must receive their first consideration.

Otter Tail Power Co—"More Power for North Dakota" is the headline for a seven-column advertisement telling how the company is cooperating with Central Power Electric Cooperative, Voltaire, N. D. The power plant of this co-op is tied in with the Otter Tail System. Included was the reason the company did not build the plant—the co-op can get federal power.

Pennsylvania Power & Light Co—Under an italic headline reading, "Everybody's Talking," pictures of animals are being run with short captions, the company's signature, and Reddy Kilowatt. A caption under a picture of a hippopotamus swimming in a pool read, "Next time I come home and find all the hot water gone, I'm gonna get an electric water heater or my name's not Egbert."

TVA Cuts Halved

Senate restores $28 million, lopped by House, for two of four steam plants

The Senate has restored funds for two Tennessee Valley Authority steam plants cut out of the Independent Offices Appropriation Bill by the House recently.

The House had eliminated funds of $28 million to provide four additional units at the Shawnee Steam Plant near Paducah, Ky. Four units already are under construction to provide power for the atomic energy facilities there.

The four proposed additional units are not specifically for meeting new loads at the atomic energy plant, but to help meet the general load growth in the entire TVA service area. However, TVA Director Gordon Clapp testified before the Senate Appropriations Committee that it is quite possible that some of the power from the proposed units would be used in the atomic energy program.

Half Regained . . . The Senate provided $14 million to cover restoration of two of the four units, scheduled for completion in 1955. Senate action on the bill also wiped out a 10% House cut of $757,000 in TVA appropriation-financed expenses.

The bill provides $186 million for TVA for fiscal 1953, $14 million below the original budget request. Differences between House and Senate versions will be worked out within the next week or two.

A supplemental request by President Truman for $150 million for TVA is now before the House Appropriations Committee. This would provide for commencing construction of steam electrical generating plants, transmission lines, and other facilities necessary to furnish power for certain of the proposed expanded facilities of the Atomic Energy Commission.

Other Boosts Made . . . Senate appropriations subcommittees, meanwhile, continued markup of Interior Department and Army Corps of Engineers funds bills, both of which contain appropriations for a number of hydroelectric projects.

Earlier, the Senate restored $300,000 in funds for the Federal Power Commission. This would bring total funds available to the agency next year to $4.2 million.

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING MARCH

State	Utility	Plant	Fuel	Capacity (Kw)
N. Y.	Herkimer Municipal Commission	Herkimer	IC	1,000
Ohio	Reading Municipal Electric Light & Water Department	Reading	S	2,000
Ind.	Bluffton Light & Water Department	Bluffton	IC	2,500
Ind.	Indianapolis Power & Light Co	White River	S	40,000
Iowa	Iowa Public Service Co	Carroll	S	5,000
Iowa	Iowa Electric Light & Power Co	Britt	IC	1,150
Mo.	Salisbury Municipal Utilities	Salisbury	IC	575
Mo.	M&A Electric Power Cooperative	Poplar Bluff	IC	9,404
Mo.	Kahoka Electric Light & Water Department	Kahoka	IC	784
S. D.	Northern States Power Co	Minn. Mobile Unit	IC	1,000
Neb.	Trenton Electric Light Department	Trenton	IC	390
Va.	Culpeper Light & Power Department	Culpeper	IC	920
Fla.	Tallahassee Electric Department	Tallahassee	S	22,500
Ky.	U. S. Army Corps of Engineers	Wolf Creek	H	45,000
Tenn.	Covington Light & Water Department	Covington	IC	1,400
Tenn.	Tennessee Valley Authority	Chichamaciaga	H	27,000
Ala.	Tennessee Valley Authority	Guntersville	H	24,300
Miss.	Greenwood Light & Water Department	Greenwood	S	5,000
Tex.	Bryan Light & Power Plant	Bryan	S	5,000
Tex.	Texas Electric Service Co	North Main	S	75,000
Idaho	Idaho Power Co	C. J. Strike	H	82,500
Ore.	California Oregon Power Co	Soda Springs	H	11,000

PLANT RETIREMENTS DURING MARCH

Mass.	Marblehead Municipal Light Department	Marblehead	S	900
Ohio	Hiram Municipal Light Department	Hiram	IC	20
Ohio	Reading Municipal Electric Light & Water Department	Reading	S	900
Ind.	Northern Indiana Public Service Co	La Porte	S	2,500
Ind.	Bluffton Light & Water Department	Bluffton	S	1,000
Wis.	Hustisford Electric Utility	Hustisford	H	80
Minn.	Northern States Power Co	Mobile Unit 2	IC	1,000
Neb.	Trenton Electric Light Department	Trenton	IC	85
Miss.	Tennessee Valley Authority	Tupelo	S	2,500
Ariz.	Northern Arizona Light & Power Co	Ash Fork	IC	80

H—Hydro, IC—Internal Combustion, S—Steam
United States Capacity as of April 1—Hydro, 19,052,567 kw; Internal Combustion, 2,001,146 kw; Steam, 55,380,818 kw; Total, 76,434,531 kw.

Storm Disrupts Service in New York City Area

A gale-driven thundershower on the afternoon of June 9 seriously disrupted operations of the Long Island Lighting Co and drove up the load of Consolidated Edison Co of New York about 11%.

In Long Island's service area winds of 84 mph uprooted trees, toppled service poles, and put miles of lines out of service. At one time an estimated 100,000 customers were without service. Heavy rains as much as 0.8 in. in ten minutes, intensified the damage. Service was restored to practically all customers in ten hours.

In New York City, where dark clouds turned day into night, load jumped from 2,230,000 to 2,480,000 kw in less than 15 minutes. There were no service interruptions as Con Ed's system is underground in the area affected.

Neighboring Public Service Electric & Gas reported a minor increase in load from 1,305,000 to 1,331,400 kw.

Roanoke Work Halted Pending Court Verdict

Virginia Electric and Power Co has suspended construction on the $27 million Roanoke Rapids hydroelectric project pending a Supreme Court decision on the validity of the federal license issued for the project.

Federal Power Commission, which issued the license, approved suspension of construction providing it is resumed promptly in the event the court upholds the license.

Vepco began construction on the project soon after a federal circuit court of appeals upheld the license last fall. Some access roads have been built, additional topographic surveys have been undertaken and test pits have been dug.

FINANCIAL

SEC Okays WWP Stock Plan

Commission to suggest only minor changes in American P&L proposal. Court order will be asked to uphold decision

Washington Water Power Co has one more hurdle to clear in order to become an independent company. That is a court order directing WWP's parent company, American Power & Light Co, to distribute WWP common stock to American stockholders.

Securities and Exchange Commission has approved the distribution plan filed by American in early April. Although the SEC opinion was still being written last week, it will suggest only minor changes in the plan. Next step is for SEC to request a court action upholding its decision. A hearing will be scheduled before the court.

Essentially Same Plan . . . The plan approved by SEC is in large part the same as one filed by American in November of last year (EW, Nov. 12, 1951, p 20).

American owns all of the outstanding WWP common which consists of 2,541,800 shares. Under the plan approved by SEC, this will be reclassified to conform to the 2,342,411 shares of American common now outstanding, and WWP stock will be given to American stockholders on a share-for-share basis. American would thus reduce its capital from $50,875,000 to $500,000.

Under terms of the plan, WWP's charter would be changed in the following respects:

1. Common stockholders would have no pre-emptive rights except when common shares are offered for cash sale other than through underwriters.

2. The board of directors will have nine members, not more than two of which could be present or former officers, employees or counsel of Washington.

3. Consideration received from the sale of additional common shares will be entered in the capital stock account.

4. Election of directors shall be conducted by cumulative voting.

WWP Gets Subsidiary . . . SEC also approved the proposal of American to transfer the assets and liabilities of the Washington Irrigation & Development Co to WWP.

On and after the distribution date no officer, director, employee, appointee or representative of American or Electric Bond & Share Co, which holds roughly 8% of the American stock, shall also be an officer or director of WWP.

Prior to the distribution date, American is to submit for SEC approval a list of names of persons to serve as members of the initial board of directors of WWP on and after the distribution date and until their successors are elected at the first annual meeting of stockholders to be held following the distribution date.

In its plan, American urged a two-thirds majority vote be required to change the charter to permit present or former WWP officers to hold more than two places on the nine-man board. SEC set aside this proposal and will require only a majority vote to change this section of the charter after the new company is in operation for one year.

Whatcom PUD Holds Back on Puget Sound Purchase

The Whatcom County PUD of Bellingham, Wash., will not join the PUD plan to purchase the Puget Sound Power & Light Co until it obtains clarification on a number of points, according to Conrad Barker, Whatcom PUD chairman.

Whatcom wants to know the exact nature of the contract under which six other PUD's propose to purchase the company and the manner in which the power pool would be operated by the combined districts, Barker said. Under proposals so far presented, the PUD commissioners administering the acquired properties would be no more than a "dummy" board responding to strings manipulated elsewhere, Barker feared.

Barker didn't say, but the string-puller he fears could be the Bonneville Power Administration, charged by Pres Frank McLaughlin of Puget Sound as attempting to gain control of the new set-up.

The Skagit, Snohomish, Thurston, Kitsap, Jefferson, and Cheland PUD's already have approved the $96-million purchase plan and reportedly expect Whatcom to join them shortly.

FINANCIAL BRIEFS

Gulf States Utilities plans to sell 50,000 shares $100 par preferred in July . . . **General Public Utilities Corp** will offer 531,949 common shares to holders of record July 1 on basis of 1-for-15 . . . **Pennsylvania Electric Co** plans to sell $9.5 million first mortgage bonds and 45,000 shares $100 preferred, competitively, Aug. 5 . . . **Utah Power & Light Co** proposes to sell $10 million first mortgage bonds and 150,000 common shares in September . . . **Virginia Electric & Power Co** plans to sell $20 million first mortgage bonds later this year.

Securities and Exchange Commission has ruled in a 2-to-1 decision that American Gas & Electric Co can sell $20 million of sinking fund debentures due in 1977. This can be interpreted as setting a new general policy by the SEC as the previous policy has been to oppose debt financing by holding companies under most conditions.

Stockholder Subscriptions: Central Vermont Public Service Corp stockholders took 64,525 common shares of 108,900 shares offered on 1-for-6 basis at $12.25 a share; balance 64,525 shares, including 38,611 shares to which New England Public Service Co waived its rights, were taken by Kidder Peabody & Co-Merrill Lynch group, underwriters . . . New England Electric System stockholders have subscribed to 788,830 common shares of 920,573 offered on 1-for-8 basis at $12.625 a share; balance 131,743 shares were sold quickly by underwriters headed by Blyth & Co-Lehman Bros-Bear, Stearns & Co.

Richard A. Mack was renominated in the Florida Democratic primary for a four-year term on Railroad and Public Utilities Commission. Renomination in this primary is tantamount to election.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
1952									
June 5	**2 95**	**3 00**	**3 10**	**4 00**	**4 21**	**4 56**	**5 37**	**5 86**	**6 49**
May 29	2 95	2 99	3 09	4 00	4 20	4 55	5 40	5 86	6 44
1st 1952	2 95	2 99	3 13	4 11	4 29	4 66	5 35	6 03	6 47
4th 1951	3 02	3 07	3 21	4 32	4 50	4 91	5 42	6 18	6 84
3rd 1951	2 87	2 91	3 04	4 05	4 27	4 61	5 52	6 24	7 05
2nd 1951	3 02	3 11	3 23	4 11	4 37	4 68	5 73	6 38	7 37

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1952	Net Income 1951	Earnings Per Common Share 1952	Earnings Per Common Share 1951
Alabama Power	12	April	$11,580,316	$9,944,784	$	$
Central Illinois Public Service	12	Mar.	4,978,230	5,290,050		
Georgia Power	12	April	10,747,009	9,166,837		
Gulf Power	12	April	1,404,939	1,119,819		
Gulf States Utilities	12	April	6,167,413	6,059,498	1.55(a)	1.81(a)
Iowa Southern Utilities	12	April	802,088	878,874		
Mississippi Power	12	April	1,935,663	1,634,311		
Southern Co. consolidated	12	April	18,867,842	15,797,698	1.17(a)	0.97(a)
West Penn Electric, consolidated	12	April	11,598,319	11,295,428	2.90(a)	3.20(a)

Note—(a) On shares outstanding at end of each period.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF JUNE 5-11			
Bonds			
Kansas Gas & Electric—1st mtg 3¼% 1982	$12,000	101.421%	3.30%
Northern States Power (Minn.)—1st mtg 3¼% 1982	21,500	101.153	3.19
Rochester Gas & Electric—1st mtg 3⅛% 1982	6,000	101.421	3.30
Common Stock			
Virginia Electric & Power—494,642 sh (being offered to commonholders on 1-for-10 basis (a), record May 23 to expire June 9)	$10,758	$21.75 *	6.44%
Kansas Gas & Electric—200,000 sh	6,675	33.375	5.99
Public Service Electric & Gas—700,000 sh	17,850	25.50	6.27
WEEK OF JUNE 12-18			
Bonds			
Kentucky Utilities—1st mtg 1982	$12,000	.....	.....
Public Service Electric & Gas—debentures 1972	40,000	.....	.....
American Gas & Electric—debentures 1977	20,000	.....	.....
Preferred Stock			
Public Service Co of Indiana—800,000 sh $25 par cum.	$20,000	.....	.....
Common Stock			
American Gas & Electric—170,000 sh	$	.....	.....
Southern Co—1,004,510 sh (to be offered to commonholders on 1-for-16 basis, record June 19 to expire July 10; company will set stock price; underwriter will be selected by competitive bidding on compensation)	.....	.....	.....
SCHEDULED FOR JUNE			
Bonds			**Bid Date**
Central Louisiana Electric—1st mtg 1982	$4,000	.....	June 23
Boston Edison—1st mtg 1982	15,000	.....	June 23
Gulf Power—1st mtg 1982	7,000	.....	June 24
Public Service Co. of Indiana—1st mtg 1982	25,000	.....	June 25
New England Power—1st mtg 1982	5,000	.....	June 25
Debentures			
Houston Lighting & Power—convertible debs 3¼% 1967 (to be offered initially to commonholders of record June 17 to expire July 7 on basis of $50 principle amount of debentures for each 16⅔ shares held; debentures are to be converted initially into common at $17½ per share)	$14,266	$100.00	3.25%
Preferred Stock			
Public Service Co of New Hampshire—50,000 sh $100 par cum.	$5,000	.....	June 23
Common Stock			
Northern States Power (Minn.)—1,108,966 sh (being offered to commonholders on 1-for-10 basis (a), record June 5 to expire June 23)	$11,644	$10.50	6.67%
Pacific Gas & Electric—2,271,300 sh (being offered to stockholders on 1-for-5 basis, record June 10 to expire July 2)	68,139	30.00	6.67
Public Service Co of New Mexico—173,136 sh (to be offered commonholders on 1-for-7 basis, record about June 18 to expire July 3)	.....	.....	.....
Empire District Electric—150,000 sh	.....	.....	(b) June 25

Notes—(a) Stockholders allowed oversubscription privileges; and (b) First Boston Corp and G. H. Walker & Co., underwriters.

CALENDAR

American Society of Mechanical Engineers
Semi-Annual Meeting, Sheraton-Gibson Hotel, Cincinnati, Ohio, June 15-19; Fall Meeting, Sheraton Hotel, Chicago, Ill., Sept. 8-11.

National Association of Corrosion Engineers
Short Course on Corrosion sponsored jointly by Cleveland Section of NACE and Case Institute of Technology at the institute, Cleveland, Ohio, June 16-20.

Illuminating Engineering Society
Northeastern Regional Conference, Hotel Preston, Swampscott, Mass., June 19-20; National Technical Conference, Edgewater Beach Hotel, Chicago, Ill., Sept. 8-12.

American Institute of Electrical Engineers
Summer General Meeting, Hotel Nicollet, Minneapolis, Minn., June 23-27.

American Society for Testing Materials
Annual Meeting, 50th Anniversary, Hotels Statler-New Yorker, New York, June 23-27.

National Retail Credit Association
International Consumer Credit Conference, Statler Hotel, Washington, D. C., June 23-26.

Canadian Electrical Association
Annual Convention, Banff Springs Hotel, Banff, Alberta, June 30-July 2.

Maryland Utilities Association
Cavalier Hotel, Virginia Beach, Va., Sept. 5-6.

Rocky Mountain Electrical League
Fall Convention, Colorado Hotel, Glenwood Springs, Colo., Sept. 7-10.

American Standards Association
National Standardization Conference in conjunction with Centennial of Engineering, Museum of Science-Industry, Chicago, Ill., Sept. 8-10.

Edison Electric Institute
Accident Prevention Committee, Sheraton Hotel, Rochester, N. Y., Sept. 15-16; Prime Movers Committee, Roosevelt Hotel, St. Louis, Mo., Oct. 6-7; Electrical Equipment Committee, Roosevelt Hotel, New York, Oct. 13-14; Transmission-Distribution Committee, Hotel Adolphus, Dallas, Tex., Oct. 23-24.

Public Information Program
Annual Workshop Conference, Edgewater Beach Hotel, Chicago, Ill., Sept. 18-19.

Public Utilities Association of the Virginias
Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 19-20.

National Electronics Conference
8th Annual Conference, Sherman Hotel, Chicago, Ill., Sept. 29-30 and Oct. 1.

Wisconsin Utilities Association
Convention of Technical-Sales Sections, Schroeder Hotel, Milwaukee, Wis., Oct. 1-3.

National Farm Electrification Conference
Statler Hotel, Detroit, Mich., Oct. 20-21.

National Electrical Manufacturers Association
Annual Meeting, Haddon Hall Hotel, Atlantic City, N. J., Nov. 10-13.

REGULATION

Ohio Edison Co has asked Public Utilities Commission approval to make rate changes for rural consumers in 34 counties that will boost company's income $860,000 annually . . . **Lafayette, La.,** has cut rates for power consumers by $105,000 a year.

Problems Faced—Promises Seen

"Our burdensome tax structure strikes from three angles: first, the additional equipment cost per kilowatt to compensate for higher taxes all the way back to the raw materials; second, the tighter money market because of the heavier drain on the investor's income; and third, the withering effect of taxes on labor's take-home pay."

New plant equipment is increasingly complex and expensive. In the modern steam generating plant the investment per operating employee may well reach the astounding total of $300,000. By the same token, employee qualifications are being raised so more and more emphasis is put upon education and experience in filling personnel requirements. As strikes and labor difficulties sweep the country we must realize that taxation of the individual is one of the root causes. Then paradoxically out of employee dissatisfaction, no matter how caused, comes a demand for government interference and a greater reliance upon the labor boss who can exercise control over the executive and administrative departments, rather than an understanding of the true cause of the economic upset and applying the right methods of solution. We cannot shut our eyes to the developments of the past weeks and months. When thinking of personnel needs and relationships, facts as they confront us must be taken to account and our best efforts aimed at straightening out current faulty economic thinking.

The pattern of financing new plant requirements is quite well established and I will not take time to discuss it other than to point out that borrowings are providing up to 60% of capital requirements with stock sales and retained earnings, classified as equity money, furnishing the remainder. Looking back, it is fortunate that refunding operations which began some ten years ago were covered in a time of low-cost long-term funds. When we go to the market now it is for new money which must come from current savings rather than reinvestment of funds derived from repayment of earlier obligations. This fact plus the enormous capital requirements for industrial plant expansion outside our industry has resulted in a normal, and I believe healthy, increase in the cost of money. Ample funds are still available if the borrower meets the market price.

It is all very well to talk about investor confidence but we must not overlook the indisputable fact that continued confidence must rest on a solid foundation of performance and earnings. The engineering feats of our utility and manufacturing companies coupled with low cost of capital funds have combined to make the price performance of electric service phenomenal. The almost unbroken record of rate decreases continued, even though in a diminishing degree, until the past two or three years. Since then the very nature of our rate structures has maintained a decline in the average cost per kilowatt hour. Now we can see no new factors which by reducing overall costs will offset the upward pressure of inflation and taxes.

GEORGE M. GADSBY,
President, Edison Electric Institute

The man who became the first president of Edison Electric Institute selected from the Far West since the office was made elective in 1946 is retiring from that post. He is George M. Gadsby—president of Utah Power & Light Co. Gadsby graduated from Marietta College with an M.A. degree in 1907 and received a B.S. degree from Massachusetts Institute of Technology in 1909. After leaving MIT he joined Warren (Pa.) Water Co, a subsidiary of American Water Works & Electric Co. Then he went with American Water Works to Pittsburgh, Little Rock, Ark., and New York. In 1917 he joined West Penn Power Co and nine years later became president. Gadsby went to work for Electric Bond & Share Co in 1929 and that year he became president of Utah P&L.

This leaves but one avenue open and that is to increase rates so as to produce a return which will attract the new money for the expansion program.

Coupled with the consideration of rates is the need for intensified sales efforts. For the past few years our major problem has been to add capacity in all of our facilities to meet the growing needs of our customers. At the same time, it was obvious that stepped-up selling was essential, to enable the most efficient and profitable

use of the new equipment, which, at today's high prices, represents such a large proportion of electric company investment. It was recognized that without determined and carefully planned sales campaigns, difficulty would be experienced in maintaining the earnings necessary to attract the capital required for continuing expansion. The police action in Korea confused the picture, with production for defense creating new requirements of a high order of magnitude so that since the beginning of 1951 serious consideration has been given to curtailment of even such sales efforts as were being practiced.

I suggest case study of this situation by each company in its own locality to the end that the almost forgotten techniques of salesmanship be taken out of mothballs and more liberal appropriations of time and money be made for the sales department including more funds for advertising.

Development of Farm Service . . . Farm electrification is far behind the progress made in the industrial plant and now is the time to sell the farmer on the basis of electrification for his own profit. The rapid progress which has been made in taking electricity to the farm through the combined efforts of the utility companies and the rural cooperatives has enlarged this opportunity until it embraces almost all the farms in America.

I strongly urge power companies to re-activate the cooperative groups of farmers, agricultural colleges, county agents and manufacturers following the pattern of twenty-five years ago when the Committees on Relations of Electricity to Agriculture gave great impetus to and obtained magnificent results in farm electrification. The opportunities today are greater than at any time in the past.

Closely aligned to production for profit on the farm is the intelligent development of stream management viewed from what should be the primary objectives of soil conservation and stream control. It seems to me that these considerations should take considerable precedence over navigation and complete priority over power development. My only suggestion with reference to this broad subject is that our utility companies are perhaps closer to regional needs than any other agency and through careful study should qualify for taking part in local cooperative efforts aimed at most beneficial use of our waters and the prevention of improvident political considerations which may impose a heavy penalty on future generations.

The development of America and the unique advantages it now holds over all the rest of the world stem from our system of private enterprise and from the basic theory incorporated by the founding fathers in the Declaration of Independence and the Constitution that government should be limited in power and exist only by and with the consent of the governed. As we study this foundation of our governmental structure we cannot but believe that every safeguard the mortal mind of man could conceive was written into those basic documents to protect against a government by man and usurpation of power by a central government. In recent years keen minds have searched for crevices in that structure and interpretive openings through which new powers might be collected and exercised to the detriment of local authority and individual rights. Some of these attempts have been turned back but all too many have prevailed.

As a result of some faults and failings in our business procedures which have been exploited out of all proportion by those ambitious for the seizure of power, we have reached a point of real danger. The lack of unity among the various segments of business, and for that matter within different part of our industry, has weakened the defense which should have been made against these changes in our basic form of government. Can we now face the facts with courage?

In our industrial undertakings two elements are common to all. These are energy and labor. A monopoly of either carries with it control over every type and form of industry and business. This fact was early realized by avowed socialists in this country who mapped out and published an overall plan for the nationalization of the electricity supply. It is not too broad a statement to say that monopolistic control by government or labor leaders of either or both of these essential ingredients of industrial production means the end of human liberty. In conducting the fight we have against the encroachment of the federal government in a proprietary capacity in the manufacture and sale of electricity we have been fighting for the freedom of all industry.

Recently the public group enlisted the aid of the President. Perhaps without full consideration on his part he signed a letter containing inaccuracies and fundamental misconceptions of rate regulation as provided in every regulatory law governing utility company rates. You may recall this letter charging that if the Department of the Interior interpretation of the Preference Clause is not sustained and the big appropriations sought for duplicating transmission lines are not approved it would open the way for utility companies to make enormous monopolistic profits on the investment made by the federal government for all the people. Mr. Truman should have and probably does know that utility companies are allowed under all regulatory laws to earn only a just and reasonable return upon their investment in property used and useful for rendering service to the public.

No Profit on Government Investment . . . If the government builds dams and power houses and the utility companies have access to the power generated for distribution to their customers they can make no profit whatsoever on the investment made by the government. They can only earn their "just and reasonable return" upon the investment made entirely at the utility's expense in transmission lines, substations and other facilities for delivering the government energy from the power plant to the customer. The President's concern apparently goes only to that part of the public served by publicly-owned systems and the cooperatives within this favored circle from which 80% of the people of the country served by the investor-owned utilities are excluded. Just another example of the government exercising monopolistic power for the benefit of a privileged few.

Perhaps the greatest need for our country today is mutual trust and understanding among every segment of our people as labelled government, labor, capital, management and the so-called "general public," which after all is nothing but a combination of the other groups. If the ultimate impact on the American individual were the directing motive of each of these groups we would have cooperation instead of strife, amity instead of ill will, constructive correction of wrongs and poor practices instead of evil poisoning of minds, class against class.

WHAT EEI SPEAKERS SAID . . .

Managing to Have Good Management

"Management that is competent, management that is continually increasing its competency in line with the growing requirements and complexities of the executive job, management that is providing an adequate reserve of qualified and trained successors, does not just happen."

LAWRENCE A. APPLEY,
President, American Management Association, Inc.

Lawrence A. Appley is president of the American Management Association. A graduate of Ohio Wesleyan University, he holds Doctor of Laws' degrees from Ohio Wesleyan University and Bethany College. After serving as an instructor at Colgate University, he started his business career in 1930 with Socony-Vacuum Oil Co, Inc, advancing to vice-president of personnel. During World War II Appley was executive director and deputy chairman of the War Manpower Commission. The AMA head is a trustee of Ohio Wesleyan University and a member of the Advisory Committee on Personnel to the Atomic Energy Commission.

The problems and needs of management are the same in all businesses. The basic principles of management, its tools and the skill in using them, are common to every business, everywhere. There are differences in companies, in products, in geography, and in circumstances, but there are no differences in the requirements of management.

In particular respect to the business of electricity supply, there are some fundamental questions that management of the industry must face fairly and squarely. They are:

Does management believe that the electric utilities are a growing, expanding industry or is management a victim of the idea that it can't do much because of government regulation?

Does management believe that the only way to increase return is to get a rate increase or does it try to make more money by going after more business?

Does management realize that we are approaching the greatest competitive economy the nation has ever known?

Has management analyzed the competition—of government and of other services—that faces the electric utility business, and is that competition being effectively countered?

Is management fully conscious of the unlimited market for electric service and of the part it must play in the capture of that market?

Does management play close attention to costs or is it inclined to be a bit careless on this point because of the cost-plus nature of rates?

Is management compensated sufficiently to hold competent personnel and to attract recruits to its ranks?

There are measures management can take that will certainly contribute to increasing its own effectiveness, to preparing its personnel for assumption of larger responsibilties, and developing potential managers.

Reduce to writing a clear-cut, comprehensive statement of why the company is in business—what its purpose is. In arriving at this statement of company purpose, clarification of the basic business philosophy of the institution is inevitable.

Reduce to writing an official company statement of the nature of management and its responsibilities, and include in this the recognition that management is a specific activity requiring certain basic attitudes, qualifications, and preparation.

Establish a current and effective means for appraising the caliber of overall management, of individual members of the management team, and of potential managers.

Put into effect a management development program, which is clearly spelled out in all the details of objective, procedure, and responsibility which will: develop the kind of management climate in which good management and competent managers can flourish; carefully select, educate, and train prospective managers; develop present managers for better performance in their current jobs and for the assumption of greater responsibilities; provide adequate executive incentive and compensation.

Become well acquainted with, and make full use of, all the means—both within and outside the company—for broadening the viewpoints of the management team, for helping executives acquire an awareness of the local, national, and international forces that are influencing their decisions and activities.

Set up formal and continuing research projects in management attitudes and techniques and in specific fields of human relations. It seems incredible that any company can consider its future as safe when it does not put a proper amount of time and money into human research.

What's New in Power Systems

"The achievements of the Electric Light and Power Industry have been outstanding because of that incentive to accomplish results in terms of the more and the better for less and less."

Big things have been accomplished in power engineering in the past few years. Major steam plants of highest efficiency are today being built for $150 per kw compared with $125 in 1947 and $100 in 1940. Compare these figures with the general construction cost index which today is from 2 to 2-1½ times what it was 10 or 15 yr ago. To our own engineers and to the equipment manufacturers belongs the credit for this remarkable performance in power plant construction in the face of rising costs. The average investment in total plant facilities per customer today is less than $500—not significantly higher than in 1940 or in the 1920's, while the construction cost index has more than doubled.

J. H. FOOTE,
Vice-President, Commonwealth Services, Inc

In addition to serving as a vice president and a director of Commonwealth Services, Inc, J. H. Foote also is president and chief engineer of the firm's subsidiary, Commonwealth Associates, Inc. Active in committee work of Edison Electric Institute and its predecessor, NELA, since 1921, Foote is presently chairman of EEI's Electrical Equipment Committee. He also is engaged in work of American Standards Association, American Society for Testing Materials, AIEE, Association of Edison Illuminating Companies, and American Society for Engineering Education.

Among the technical and engineering advances made by the industry are:

1. Steam temperatures and pressures have been raised to higher values with consequent savings in fuel. Machines up to 200,000-kw size are now designed for 1050 F, and 1100 F will presently be in operation on at least one system.

2. Pushing beyond the economy possible even with these high temperatures and their associated high pressures, the industry has recently committed for millions of kw of reheat generating equipment designed for these new steam conditions, and giving promise of significant operating economies.

3. Construction cost has been reduced in numerous instances through the reduction in building volume, or through the actual elimination of much of the enclosing buildings.

4. Skillful arrangements of controls and attention to the design to reduce the number of operating positions has saved operating expense and has increased reliability.

5. Attention to details of bearings, couplings, physical clearances and maintenance facilities has improved the reliability of all generating plant equipment.

6. Improvements in reliability make possible savings of investment in spares and also savings through the scheduling for maintenance a great deal of the essential equipment in the generating plant.

Main power transmission lines today are carrying heavier loads than ever before, and at the same time the reliability of these lines and associated equipment is being increased through more scientific design. Improved relaying and rapid reclosure of circuit breakers when tripouts do occur have increased the service continuity of lines so that the availability factor of transmission circuits is extremely high. The construction and testing of an actual 500-kv transmission line by one company provided full scale test and research facilities never before available.

Throughout the industry distribution systems have been undergoing strengthening, with engineering ingenuity as well as individuality definitely in evidence.

The biggest factors influencing the engineering design are those of the local conditions and they may lead to contrasting solutions. Illustrative of these methods of resolving individual situations are: Higher primary voltages or increased capacity of individual feeders at existing voltages, both to require fewer substations of larger units; simple unit-type substations; group regulation of feeders; load transfer facilities on lines outside of substations and planned use of mobile substation units for maintenance in lieu of duplicate facilities.

A marvelous job has been done in bringing reliable and economical power to farm customers so that company after company has been reporting electricity available to substantially all farms in their franchise territory.

Load surveys and forecasts coupled with comprehensive measurements and calculations show the way and provide a pattern of reinforcing or rebuilding for future loads. Continuous planning is to salvage the good and improve the weak, and to look ahead another quartercentury.

"If public power advocates have their way, then the extent of future public electric power expansion is limited only by their desires and ambitions and the tax-paying capacity of the citizens of the nation."

Many Implications In Niagara

The controversy before Congress as to whether the government, Federal or State, or private enterprise should construct and operate the overall development of Niagara River represents the most ominous threats yet made to privately owned electric light and power industry. Upon analysis of the justification advanced for a public project, it is clear that if public power advocates have their way, then the extent of future public electric power expansion is limited only by their desires and ambitions and the tax-paying capacity of the citizens of the nation.

The Niagara controversy is before the present Congress in the form of three divergent sets of bills. Under Lehmán-Roosevelt bill, the project estimated to cost about $350 million would be constructed and paid for with funds derived from tax revenues, with provisions for possible transfer of the project to the State of New York, upon terms and conditions which the State has already found objectionable. Under Ives-Cole bill, the project would be constructed, operated and financed by the State of New York through its Power Authority. Under Capehart-Miller bill, the project would be constructed, operated and financed with private capital by private enterprise represented by five New York State electric companies.

The controversy followed ratification of a treaty in 1950 between the U. S. and Canada permitting diversion for power purposes of all of the water in excess of that necessary to preserve the scenic spectacle. This additional diversion will develop net additional generating capacity on American side of 1,132,000 kilowatts. The limited quantity of water heretofore made available by international agreements has been utilized up to now by Niagara Mohawk Power Corp System, which has constructed and operated the only American development at the Falls.

Entirely absent are all of the considerations heretofore advanced by public power sponsors for public power projects. There are no considerations of flood control, irrigation, reclamation, sanitation or navigation.

Examination of the reasons advanced for a government project at Niagara discloses they are equally applicable to any proposed power development wherever located.

1. Public power sponsors persist in labeling New York State as a "power-starved" area. The facts are that all demands for service have been met.

2. Public power sponsors rely heavily upon the old chestnut-government power means cheap power. Public power advocates have yet to deny the findings of the task force of Hoover Commission that difference between private and public power bills "is roughly equal to tax component."

3. Public power advocates recklessly assert private companies would be unwilling to spend funds necessary to construct the project water ways in such a manner as to minimize security hazards. Private companies most strongly urge construction of multiple tunnels, from an engineering point of view and for security reasons.

4. Public power advocates further assert private companies would be motivated to minimize cost in order to increase their profits. Investors in regulated public utility companies receive only a limited return on capital which is actually invested in utility plant.

5. Advancement of so-called preference policy as a reason for a public power project, represents one of the most vicious aspects of the Niagara controversy. In the State of New York, there are only six small REA cooperatives having an aggregate of some 4,400 customers. Municipal distribution systems serve little more than 1% of state's electrical customers.

6. There is no valid concern as to preservation of scenic beauty of the Falls since that is the responsibility of International Joint Commission regardless of whether the project is public or private.

EARLE J. MACHOLD,
President, Niagara-Mohawk Power Corp

Earle J. Machold received his LL.B from Syracuse Univesity Law School in 1927 and became associated with the law firm of Sullivan & Cromwell, New York, in 1929. The following year he joined LeBoeuf & Winston, New York, later becoming a partner. In 1942 Machold severed his connection with the latter firm to assume the presidency of Niagara Mohawk. He also is a director and member of the executive committee of the utility. In addition to being a member of the American Bar Association, the utility president is a trustee of Syracuse University and the State University of New York.

ABEL WOLMAN, Professor of Sanitary Engineering, Johns Hopkins University

> **"We have reached a strange impasse when any proposal for intelligent stocktaking of our policy for water resources development is met with the charge that such proposals are contrary to the national welfare."**

Abel Wolman, a graduate of Johns Hopkins University with the degrees of B.A., B.S., and Honorary Doctor of Engineering, is professor of sanitary engineering at Johns Hopkins. Wolman started his career in 1914 with the U. S. Public Health Service and from 1922 to 1939 was chief engineer of the Maryland State Department of Health. Besides editing various publications related to his field, he served as editor-in-chief of the Journal of American Water Works Association from 1921 to 1937. Wolman also has acted as consultant to industrial, state, and national organizations.

Too Much Politics in Water Policy

Impatience of political leaders to move forward rapidly with great Federal expenditures on water resources development is one of the most alarming political characteristics of 1952. There is no policy to guide such spending in the most logical, most competent and most economical manner.

One cannot escape the conclusion that this desire to move forward with great rapidity even though the goals and the methods of attaining them are both flagrantly in error, can only be the product of misguided emotion or political necessity or both.

The real challenge of the problem is how such a tide of activity may be stemmed sufficiently long to take stock and adjust policy and method so that expenditures of whatever amount, large or small, are made with as much technical and social wisdom as we can summon up.

When these problems are discussed, however, it is often charged that these proposals are anti-social, that they will deprive people of their appropriate share of our water resources. We have reached a strange impasse when any proposal for intelligent stocktaking of our policy for water resources development is met with the charge that such proposals are contrary to the national welfare. To spend for the sake of spending can hardly be a permanently sound objective of national policy.

The Missouri River basin is larger than the combined areas of France, Belgium, the Netherlands, Denmark, Germany, Switzerland and Italy. For sheer size alone it should give the planner considerable pause. If we were confronted with the planning of a water resources development program for the countries just mentioned, we probably would insist upon a reasonably long period for technological analysis, for project evaluation, for execution and for financing. In this area, however, many of these objectives have been telescoped into a period of less than 10 years. Already almost a billion and a half dollars have been spent on projects and somewhere between 8 and 12 billion dollars of expenditure are contemplated for the future.

In the undertaking, competitive legislative policy and competitive agency responsibility are still unresolved. Sharp conflicts of opinion between the Department of the Interior and the Corps of Engineers still prevail, although they are masked under the general "cover-all" of the Pick-Sloan plan. This plan has undergone major change as experience and natural calamities have pointed up difficulties therein.

One of the most disconcerting features of the Missouri Basin project planning stems from the fact that as natural catastrophes have occurred, major changes in program have been rapidly, if not hastily, projected. After the Kansas River floods in 1951, the program was changed by December, 1951, to the extent of proposing 14 additional reservoirs at an expenditure of some $350 million. How are these facts to be reconciled with statements by prominent officials that if the original project had been completed prior to July, 1951, the damage would have been avoided?

The 1952 floods on the upper Missouri Basin may result also in further modification of the project plan. No one at the moment is prepared to state what the ultimate cost of this vast undertaking will be. Should billions of dollars be spent while many of these tremendously important technical, legal and administrative issues are still quite unresolved? Is the impatience demonstrated by our great political leaders a sound guide for action?

Where Industry and Education Meet

In a very real sense our problems, for us who are administering institutions of higher learning, are closely akin to your own. We are producing power through trained and educated young men and women; you are producing power through kilowatts. Your production capacity comes to some 90 million kilowatts, including both public and industrial capacities. We have had in process during this academic year some 2,116,000 human beings. We, too, have problems of procuring our raw materials, processing it over a period of several years, financing it, and finally disposing of it to a satisfied constituency.

We suffer somewhat from the same vicissitudes, you and I, in our executive responsibilities. You fear government production of power, with all of its concomitants of public bookkeeping which recognizes no complete cost accounting procedures, with all of its implications of socialization and the inhibitions of the free-enterprise spirit.

We in education, too, fear the long shadow of the federal government, casting its inexorable influence throughout our operations. Since World War II there has been a great increase in federal support for our college structures.

New threats of government seizure of industry have catalyzed the frightened interest of the business community in recent weeks. New programs of government support for higher education have been several times introduced into the Congress in recent years, in behalf of both endowed and public education—grants for medical education, scholarship funds for our American young people, exchange scholar programs to implement Point Four—all have been either proposed or implemented. Slowly, almost imperceptibly, private, endowed education is being drugged by heady potions from the public trough.

The increased paternalism of government in both your business and mine give cause for sober reflection on the part of the intelligent citizens of our republic. To stem the tide is our common problem.

We in education need you. To meet our growing needs we cannot float bonds and debentures or offer stock issues. The philanthropy of a generous public has been crippled by high taxation levels, which has largely eliminated the individual donor as a source of education's support. Two alternatives are before us—federal subsidy, or prompt and wholehearted support from the American business corporation.

Few corporations are giving anything like the five per cent of their earnings before taxes as permitted by the Internal Revenue Code. The average today is approximately one per cent of these earnings annually. What chance has private enterprise, if the lights of endowed education are turned down, in favor of the only other alternative—education under federal sponsorship?

As a one-time teacher of public utility management, I have maintained a long and continuing interest in your industry. I think I have observed, however, a more aggressive attitude on the part of some of your sister industries in American business than you yourselves have sometimes shown.

In a day when political pressures are preserving the political gains of other elements in our economy—of farm subsidies in an era of unprecedented prosperity, of gigantic labor unions levying more and ever more demands, of federal welfare programs now running in excess of $2 billion a year—the voice of business must be heard in behalf of sound finance and a sound economy; the voice of education must be heard reiterating, again and again, the positive values of our way of life.

We need the courage and forthrightness and integrity to face the problems of the next few decades. The challenge of a great partnership lies before us—a partnership between one of the great and fundamental industries of America and the education upon which must rest, in the last analysis, the success of our common citizenship.

"We in education, too, fear the long shadow of the federal government, casting its inexorable influence throughout our operations."

DEANE W. MALOTT, Pres., Cornell University

Besides being a director of General Mills, Inc., B. F. Goodrich Co, Owens-Corning Fiberglas Corp, and Pitney-Bowes, Inc, president of the Association of Naval ROTC Colleges and Universities, Deane W. Malott still finds time to serve as the sixth president of Cornell University—a post he has held since 1951. Malott graduated from the University of Kansas in 1921. He received his master's degree from Harvard Business School in 1923, remaining there as assistant dean until 1929, when he became vice-president of the Hawaiian Pineapple Co. Upon his return to Harvard in 1933 he became an associate professor and in 1939 was made chancellor at Kansas, serving 12 years in this position until the Cornell appointment.

Politics and Business—Two Languages

"Is private business in this country ready to say that government may render no service to business for a price or profit? Are you ready to say that we should not have municipal power plants? That other municipal services for which fees are charged should be discontinued and set up on a private basis?"

The great conflict of our times is that being waged between government and business, in which each is accusing the other of being too big, and for creating the evils of our economic structure—primarily inflation.

What must be kept in mind in this situation is that government and business are composed of men, and there is no more fundamental motive than to grow and build.

Though I am a businessman, I have found since my entry into the government that government cannot be extravagant, because its resources are limited to the resources of all the people, and as long as there are unmet needs, it is our obligation to take those resources and attempt to meet these needs.

Our final reward in meeting these needs is votes, and the test of our success is that we be returned to office and entrusted with more power.

This power leads to bureaucracy at times, but it must be remembered that there is bureaucracy in business, too, since this disease can fasten itself on any organization that requires large numbers of people.

As the desire for growth operates in the two fields, it produces a conflict, with consequent distortion, misunderstanding, and finally, competition. Men on both sides come to feel that their pattern is the most successful and efficient. Private business says that government must withdraw from activities which are in conflict or substitutes for services that can be provided by business. The other extreme is represented by Russia, where there is no private business, and the right to serve the people is vested solely in the government.

Is private business in this country ready to say that government may render no service to business for a price or profit? Are you ready to say that we should not have municipal power plants? That other municipal services for which fees are charged should be discontinued and set up on a private basis?

There may be valuable developments, which on the face of them seem so vast with hope of reward so slim that private capital cannot be induced to take them up. As a businessman, should I say I will not support the use of government funds in that kind of situation, and, if there are no private funds, say that kind of a situation is impossible, is is desirable, but we shouldn't have it?

There isn't any question but what in this matter of the ultimate service that the citizen or the consumer wanted there seemed to be situations in which the government was the more logical source of the solution.

There are many corallaries to that situation, and your industry is trying to find the point which represents a reasonable, profitable dividing line between the service of government and the service of private industry.

To find it we must raise ourselves above what seems to be our selfish interest, and permit our representatives to vote safely for the long-range common good.

The court of last resort is the individual citizen, and if you have a point of view which is more worthy than that of the men who make their living in government, then you can win the citizen to your view.

WALLACE F. BENNETT,
U. S. Senator from Utah

From second lieutenant to United States Senator is the story of Wallace F. Bennett, who hails from Salt Lake City, Utah. After serving in the infantry during World War I he graduated from the University of Utah in 1919. He was president of Bennett's (paint and glass distributing company) and Bennett Motor Co, Salt Lake City, until 1950 and now serves as chairman of the board for both organizations. He was elected to the Senate in 1950 and is a member of the Senate Post Office and Civil Service Committee and Committee on the District of Columbia and a former member of the Banking and Currency Committee. Senator Bennett is a past president of the National Association of Manufacturers.

"The Federal Power Program will not be carried to its ultimate conclusion and our industry will continue to be the successful and prosperous one it is today."

Let's Look Into The Crystal Ball!

J. E. CORETTE,
Vice-President, The Montana Power Co

A native of Butte, Mont., J. E. Corette is a lawyer and vice-president and assistant general manager of Montana Power Co. Corette received his education at Montana State University and the University of Virginia, where he earned his LL.B. He practiced law in Missoula and Butte before joining Montana Power in 1934. The utility official is a member of the Montana Bar Association and the American Bar Association. He is a past president of the Butte Rotary Club.

If the people of the Nation continue to be alert, the Federal Power Program, as outlined by its authors, will not succeed. Congress definitely has not adopted and does not look kindly upon a Federal Power Program in which the Interior Department would take over the private power industry. I am very satisfied with the attitude evidenced by Congress when a utility is doing or is ready and willing to do the job.

However, if the present administration can and does carry out its power program through future years, our industry is doomed and our personal futures and the futures of the people of America are dark and dreary.

Our fighting forces are far stronger than the opposition and if each utility company in these United States adopts and executes a sound intelligent program, our future and the future of the American people is bright.

Our future is so intermingled with the future of good government in these United States, with the future of all private ownership of property, with the future of personal freedoms and with the future of the people as a whole that they cannot be separated.

We have before us one of the most important—most worthwhile challenges ever confronting any industry and any nation, with a continuing land of plenty, if we do our jobs as we should.

I would suggest the following program, one which should assure the continued success of our industry:

1. To maintain at all times adequate facilities—generation, transmission and distribution—to supply the power requirements in your area.

2. Efficient and courteous service to all members of the public and at lowest possible cost.

3. A capable Information Department which keeps your employees and the public informed on all problems relating to our industry and our form of government.

4. A willingness and readiness when economically feasible to build power projects on the streams of the nation.

5. A willingness and readiness to build generating facilities and all other power facilities at Federal dams, whenever it is not economically feasible to also build the dam.

6. A willingness and readiness to build all transmission lines.

7. An aggressive, active, forceful opposition to the government doing *any* of the things a private utility is willing to do.

8. Organization of the electric companies into a united front. We must make sure that the industry story is presented to the public adequately and correctly, and that we think, act and speak as a team.

By the end of June, 1952, the Federal Government will have spent approximately four billion, 258 million dollars on projects involving power, exclusive of the two billion 700 million which has been appropriated for REA. The spending of this money has been concentrated in certain areas.

Although the foes of private utilities are so formidable that they could destroy the industry, intelligent activities by the industry can assure a long and successful future. Likewise, no activity, or limited activity, or unintelligent activity by the industry will lead to the eventual destruction of our companies by a tortuous process akin to a Russian trial and prison.

Our real problem is much broader than a utility industry problem. If the utility problems could be isolated, the difficulties would be reduced to a fraction of their present importance.

As I see it, our entire nation is on a direct road to a lower standard of living, to fewer comforts in life, to reduced freedom, to something comparable to what England has today, unless the people demand a complete change in administrative thinking in Washington.

How Do Thoughtful Young

F. E. **VERDIN,** Panel Chairman, Director of Personnel, The Cleveland Electric Illuminating Co

The Chairman Presents the Problem

First . . . Today's graduate wants recognition of his talents and successful performance through reasonably rapid advancement and commensurate salary growth.

Second . . . He wants assignments with responsibilities that develop his potential and challenges his technical competence.

Third . . . The graduate wants to work where he can use his specialized training within a reasonable time.

Beside determining what students look for in choosing a career, the EEI survey attempted to find out what they believe, that determines whether they choose our industry. Here are some of the highlights:

- Only slightly more than half the graduates gave a reasonable favorable reply, to questions dealing with progress in employment in electric utilities.
- Over two-thirds of the replies were decidedly unfavorable on the matter of compensation. They believe our hiring rates low and salaries lower than for comparable responsibilities elsewhere.
- Replies were divided evenly regarding the challenge of the work. But many comments claimed the work was too routine and that the really challenging work is done by manufacturers and engineering firms.
- As to recruiting, professors say that the industry's job is only fair. We are not forward in making ourselves available or in presenting our case.

And so you have in capsule form an idea of the regard in which we are held by the students.

Now consider what three executives say about how electric utilities measure up to these three points so important to young college graduates in choosing a career.

DR. ADAM S. BENNION, Vice President, Utah Power & Light Co

Keep Salaries In Line

Demand so far outruns supply today that engineering graduates are pursued by opportunity. On one college campus a graduating class of 145 engineers has been interviewed by 290 institutions from 30 states.

A combination of circumstances has brought about this heavy demand:

1. The Korean War with its draft and enlistments
2. A stepped up program of production
3. Need for engineers in military establishments
4. Need for trained men in Atomic Research
5. Need for men in newly expanding industries
6. Need for engineers in governmental circles
7. A new appreciation of the value of sound engineering training as a preparation for management.

In 1949, 1950, and 1951 American industry absorbed 45,000 graduate engineers annually. The national 1952 estimated crop of 26,000 engineering graduates will be wholly inadequate. Estimates of 20,000 for 1953 and 17,000 for 1954 are still more discouraging.

In the face of such shortages no mere increase in salary can solve the problem. Salary figures take on particular significance however, when big offers deprive the utilities of new recruits and cut into established personnel.

To get the facts, we checked 10 western utilities and the universities that serve them. The findings are these:

- Money is only one element in decisions limiting the number of engineers available for utility jobs.
- Attacks on utilities have led young men to question whether or not government would eventually take over the business of supplying electricity.
- Perhaps because of such attacks the industry has been careful—even conservative—wages-wise.
- The evidence is clear that the utilities have been less dynamic in their recruiting than others.

The following tabulations shows how utility monthly starting salaries for beginning engineers have changed during the last three years for the 10 companies.

	Low	High	Average
1950	$225	$285	$262
1951	243	313	280
1952	257	328	295

As against these figures other employers in the area are now offering:

	Low	High	Average
1952	$250	$375	$310

Many of the offers approached the high of $375. Utilities having low or average wages cannot compete.

There are a variety of suggestions for action but over the long pull our best hope seems to lie in helping to stimulate larger enrollment in university engineering courses and in keeping our salaries in line with sound, consistent engineering practice.

Younger engineers today sometimes feel that routine assignments are beneath their ability. It is the employer's responsibility to show these men that the daily routine provides a background for larger responsibilities.

The utility industry along with other industry has been careless in the utilization of engineering talent in the past. Today this has been largely overcome and our industry is re-examining the qualifications of existing engineers and is looking for the best of the new graduates. These men are being offered an unusual opportunity for advancement.

Engineers Choose Careers Today?

L. R. GATY, Manager, Engineering Department, Philadelphia Electric Co

Pick Up Challenges Offered,

Any assignment with responsibilities that present a challenge to a new employee, requires two things:

First—A challenge must be offered.

Second—The new graduate must pick up the challenge and carry it forward.

The electric power industry has an abundance of unsolved problems. This applies not only to the technical field but to human relations, relations with governmental agencies, and many other fields.

The field of the utility engineer encompasses practically the entire engineering profession. There are problems in civil, electrical, mechanical and chemical engineering. However, someone must first see the problem, define it and outline it to the manufacturers, work with them to see that the solution is practical and reasonable, and then return and apply it to the original problem to make sure that it is comprehensive and does not involve other corollary problems.

W. O. TURNER, President, Louisiana Power & Light Co

Join Utilities and Get Your Feet Wet Fast,

Two factors bear on the problem of satisfying the concern of today's college graduate about early use of his specialized training.

First is the fact that our industry is a type where specialized college training can be utilized after a very short period of orientation. After indoctrination, his job assignment invariably calls for him to put his specialized training to work much sooner than in many other industries.

Second, ours is a growth industry. We could cite figures on the tremendous growth experienced by this industry in the last decade. But suffice it to say that it is one of the most unprecedented of any industry, and that ours is a relatively young industry.

This growth has made it necessary for us to push young college graduates into jobs far more challenging than the drafting room assignments they might have had in other industries. They are tackling problems now, with only one or two years experience, that before 1940 many of us would have been inclined to refer to more experienced men.

Certainly growth of our industry offers a fitting challenge to the college graduate who wants to get his feet wet in a hurry.

Then too there is an ever-increasing reliance of other industries on electric power to achieve greater efficiency and production. The college graduate doesn't realize the growing importance of our industry to the industrial economy of our country. We share no small blame for this. There is a great essentiality to our business which gives it the all-important stability to weather depression periods.

Finally, it appears that what we have to do is to present the facts surrounding our industry—its growth, its importance to our industrial economy and its stability—if we are to overcome some of the anxiety our college graduates have for it as a career field.

As The Chairman Adds It Up—

As an industry I suggest we take steps to make sure that we are "Better Than They Think" in every company in the industry. Here is a program that will do it:

1. Study the hiring rate—it need not be top, but it must be respectable in comparison with competition.

2. Make adequate provision for progress in Job assignment, Promotion, and Pay for youngsters as with you.

3. Provide for training and development of these boys as individuals.

4. Use these people at their highest skills—don't make them wait 10 years to get their feet wet.

5. If you're not already doing so bring your salary progression structure in tune with 1952 practices.

6. In place in the civil service nature of security in jobs in our industry, play up the competitive phase of our business and the rewards for outstanding achievement.

7. Finally build a program of educational relations—through a planned program of contacts with colleges such as holding faculty seminars, summer employment for teachers, etc.

In short, let's all become Better Than They Think and then let's "tell 'em so" by every device at our command.

ALLAN B. KLINE, President, American Farm Bureau Federation

"The road to nationalization is a good, easy, downhill road. If by any chance you can come back, you have to climb."

Allan B. Kline has been president of the American Farm Bureau Federation since 1947. Kline, who graduated from Morningside College in 1915 and later earned a bachelor of science degree from Iowa State College, has served 17 years as a director of the Iowa Farm Bureau Federation, including seven years as vice president and four years as president. Before becoming head of the American Farm Bureau, he served two years as vice president. In 1945 Kline was consultant at the United Nations meeting in San Francisco. As a bureau delegate he has participated in several European agricultural conferences.

To Defend the American Way

The problems we face are not necessarily divided up into business problems, farming problems, government problems, labor problems. A lot of them are common problems. The biggest is the creeping kind of socialism crawling over the land, which is a greater threat to our national welfare than the atheistic communism which threatens us from without.

This pattern of substitution of political determination for individual citizen's freedom of choice is best evidenced in the percentage of the total income of all people which is taxed away from them in the pretext that this money is being spent for the benefit of all the people. If this trend continues for another ten years, a lot of people are going to look back and say, "How in the world did we get here? We never started for this place."

This stuff is sold to the American people as the only possible way to control inflation. This control of inflation is a fake. Those who are behind these plans are the second and third echelon people in government who want to change our economy and are intent on augmenting inflation instead of trying to control it.

It is done with intention and it is a pattern for nationalization, and the reports that are prepared for the people tell only the side of the story that the propagandists in government want publicized. You do not get the pros and cons.

To counter this trend we had better use the American way of incentive, rewards and freedom of choice. We have to control federal expenditures; the transfer of purchasing ability from the people to the government.

Of the proposed 87.2 billion dollar budget for the next year, 76.8 is being collected in taxes. To make up the remainder of its expenses, the government isn't printing greenbacks; it is being a bit more subtle by putting bonds into banks, drawing checks on them, with the promise of paying back at some future time. The only way they can be paid back is by taking the money from the people in taxes.

Eventually the people get the money thus created but there are not enough goods and services produced for them to buy with it. This is what creates inflation: creating money to pay the bills of government faster than goods and services can be produced. It is the transferring of purchasing ability from the people to the government by taking the value out of personal income.

It cheapens the dollar until it takes the value out of private capital, until a man's initiative to invest is destroyed. This is the result of inflation, which leads directly to nationalization of industry and business. We must see this does not happen.

Otherwise the only alternative is rationing, per capita distribution, discontinuance of freedom of choice, use of production subsidies, which are incompatible with the American way of initiative and reward.

Our job is to stabilize the general price level to prevent the continuing inflation. To accomplish this aim we must put people of courage at the head of our government. Behind them we must have people who have faith in the principles that have made this country great.

We must make decisions on the basis of what is right to insure the dignity and importance of the individual as a citizen.

Safety Needs Management Leadership

Although the accident frequency rate in the electric utility industry has declined substantially since 1947, it is not as good as it was 20 years ago. In respect to severity of accidents, the condition today is about the same as then. But today accidents cost much more; the cost per injury in 1935 was $148, in 1950, $362. These are just the wage costs, do not include everything. The reason is increase in wage rates.

The main purpose of accident prevention programs is the saving of life and the lessening of human suffering and hardship. This purpose fully justifies the expense and effort of accident prevention, but attainment of it is not the only benefit that results. Reduction of costs, of waste, of employee absentism, and improvement of efficiency are among the additional benefits.

To be effective, an accident prevention program must have the sincere support of every person in the organization, from the president down. It cannot be effective in the lower echelons if it is not wholeheartedly participated in by those at the top.

There are no standard safety programs. There are, however, certain principles fundamental to all. It is the skillfull application of these principles that differentiate a successful from an unsuccessful program. They are:

Management should commit itself unreservedly to accident prevention by an unequivocal statement of safety policy. This must be backed up by active participation in planning and execution of safety measures set up by management.

The safety director should be a staff consultant and advisor to top management, and should have neither line responsibility nor line authority. He should be consulted in all matters of structure and equipment design, construction and purchase, and on placement of personnel. He should see to it that safety inspections of operating equipment and property are made regularly.

Most effective programs use committees. They are usually central (executive) and division (departmental) groups. The central committee should be headed by the president or general manager with the safety director as secretary. Membership should include departmental executive heads who in turn are the chairmen of the division committees. Under these are permanent or temporary committees such as engineering, fire, investigation and other as may be needed. The central committee determines and interprets broad policy and the division committees perform in like manner within their respective scopes of interest.

On-the-job training must include all safety instructions as part of normal operating procedure. Protective equipment should be furnished and maintained and its use enforced.

The safety program should be publicized by every possible means—movies, sound-slide films, charts, graphs, cartoon posters, etc.

Medical first aid and resuscitation should be part of all training programs in all industry. Industry owes this to itself and to its community. Trained hands are never wasted when emergency arises.

Training in fire prevention, recognition of fire hazards and correction or control of hazards is an integral part of a safety program and necessary to the safeguarding of the plant or equipment.

Every utility has a fleet of automotive vehicles. No one is unaware of the traffic conditions of today—therefore, common sense, if nothing else, requires training for drivers, education of drivers and enforcement of safe driving practices.

World conditions require planning for protection of property and equipment and training of personnel for emergency conditions which would be attendant upon attack or invasion or the preliminaries to attack or invasion. Plant and personnel protection and security programs will be found to be only extensions of successful accident prevention programs.

"Too many of us still see accident prevention as simply a praiseworthy attempt to keep people from getting hurt or killed, fail to see that this is but one important part of a concerted attack on industrial, operational, mechanical and personal inefficiencies."

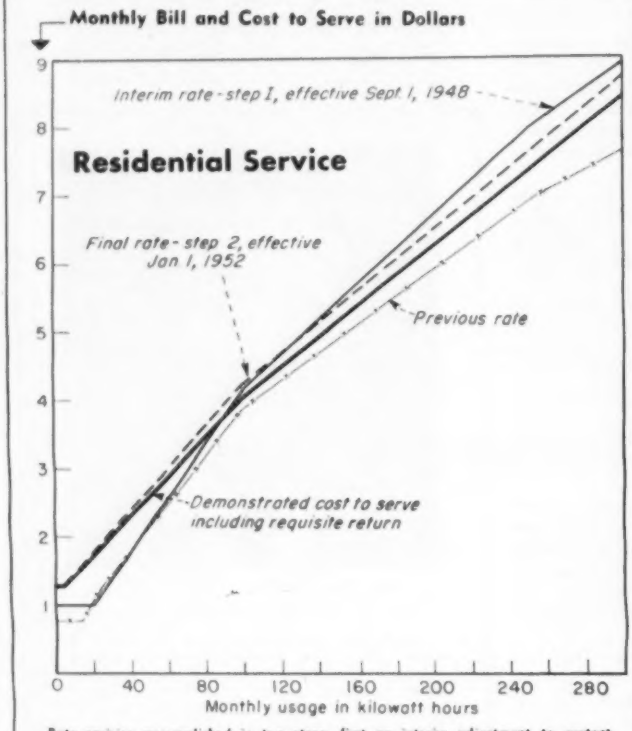
DR WALTER A. CUTTER,
New York University Center for Safety Education

Safety work consumes much of Dr Walter A. Cutter's time. He is assistant director and assistant professor of industrial safety of the Center for Safety Education of New York University and is co-ordinator of military safety training at NYU. Dr Cutter also is advisor to the Secretary of the Army on accident prevention training. Besides being active in the affairs of the American Society of Safety Engineers, he is a member of the National Safety Council, Greater New York Safety Council, and the President's Conference on Industrial Safety.

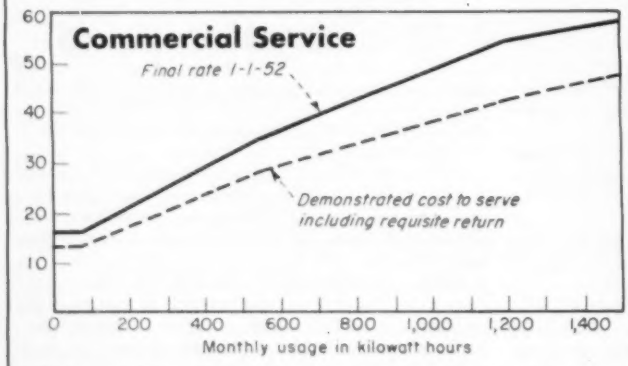
We Put Our Rates Into Line With

Antiquated schedules did not produce sufficient revenue to cover present-day expenses. Radical revisions accomplished in two steps to get final rates into promotional form

C. A. OLIVER, Manager, Taunton (Mass.) Municipal Lighting Plant


Monthly Bill and Cost to Serve in Dollars
Interim rate - step I, effective Sept. 1, 1948
Residential Service
Final rate - step 2, effective Jan. 1, 1952
Previous rate
Demonstrated cost to serve including requisite return
Monthly usage in kilowatt hours

Rate revision accomplished in two steps, first an interim adjustment to protect revenue and later a final form conforming to cost pattern


Commercial Service
Final rate 1-1-52
Demonstrated cost to serve including requisite return
Monthly usage in kilowatt hours

Wider spread between revenue and cost to serve in supply to commercial customers than to residential

It is possible for an electricity supply system to adjust its revenue position by rate revision without arousing significant public resentment. The Taunton (Mass.) municipal lighting plant did so. The revision was accomplished without undue disturbance of customer relations by attention to three things—timing, method, and manner.

When the present management took over in April, 1948, revenues from electric and steam sales were not covering costs in some cases. A substantial deficit was faced. Approval was promptly secured from the Municipal Lighting Plant Commissioners to employ a consultant to study the costs of these services. He suggested a two-step procedure for correcting the situation.

The forms and levels of the Taunton rates had remained practically unchanged for many years despite substantial increases in labor, equipment, and material costs. Immediate relief was necessary to overcome these spiraling costs. These facts were presented to the citizens in newspaper publicity and advertising in advance of the first step towards rate revision. This step was taken in September, 1948. The people were informed of this interim adjustment—a sort of "first-aid treatment pending full diagnosis and prescription of curative measures.

The interim adjustment was based on a quick study and allocation of costs. It amounted more or less to a straight across-the-board rise in the prices per kwhr and per M lb of steam. It raised the residential minimum monthly bill from 75¢ including 15 kwhr, to $1, including 20 kwhr. For usages between 20 and 40 kwhr, it operated to decrease the bill slightly. Above 40 kwhr, there was a gradual rise that took the bill for 300 kwhr from around $7.60 up to about $8.95. This adjustment did not hit the low user very hard, and being, so to speak, an emergency measure, it allowed the large user to look for some reduction when the final rate revision was made.

Our Costs

Consumers were told of the intention of the Commission to adopt, as final, rate schedules that would recognize increases in energy consumption and improvements in load factor as justifying lower unit rates on a cost basis. Per contra, the necessity and equity of higher unit prices for consumers whose usages remained in the lower brackets were explained.

It was fully appreciated that the interim step would accentuate the inequities of the existing rates since their forms were not changed. But it would provide ample margin for the later correction of the rate forms with practically no loss in over-all class revenues.

A detailed study of the costs to serve the several customer classes was made on the data of experience in the first calendar year (1949) with the interim rates. Guided by the findings from this analysis, entirely new rate structures were designed, conforming as closely as practicable to the demonstrated cost patterns for each class of service.

The noteworthy feature of the new rates, which went into effect Jan. 1, 1952, is the increases in charges for the first blocks of kwhr and accompanying decreases from the interim rates in the follow-on blocks. It provided legitimate opportunity to publicize the new schedules as "new low promotional rates," which they were, relative to the interim charges that had been in effect for over two years. Complete statement of the new residential schedule appears in one accompanying panel and in another the sales argument for it.

Notwithstanding efforts to inform consumers on the changes in energy prices, many complaints were anticipated about the size of bills under the new rates as well as under the interim rates. But the number of complaints in relation to the total bills rendered under the final rates is a negligible quantity. This is probably due to the fact that the timing was such that the last bill under the old rates was for the maximum month's usage (December). This fully justified the timing program which selected Jan. 1 as the effective date, it being obvious that January is the month with the least number of small bills (0 to 45 kwhr) on which the impact of the higher beginning charges was greatest.

Calculations of future revenues are, of course, based on the consumption data of past periods. Unless the pattern of usage changes materially in the future, the new rate forms should continue to provide the plant with adequate revenues from each of the customer classes. In addition, such reductions in load factor as may occur with a business recession will result in lower loss in the net income. In other words, losses in revenue from high load-factor business at the bottom of the rate will be offset by a saving in expense because the tail-end prices in the rate have been brought nearer to the production cost of the energy applied.

General Residential Service Rate A

Available for private residence or individual apartments where electricity is used for domestic purposes including lighting, heating, refrigeration, water heating, general domestic appliances and incidental power.

RATE

For the first 5 kilowatt hours per month	$1.25
For the next 25 kilowatt hours per month	.035 per kwhr
For the next 70 kilowatt hours per month	.03 per kwhr
For the next 200 kilowatt hours per month	.0225 per kwhr
For all over 300 kilowatt hours per month	.015 per kwhr

The foregoing rate includes the capacity charge for first 5 kilowatts of monthly maximum 15-minute demand when measured.

CONTROLLABLE HOT WATER HEATING

Where a controllable electric water heater which complies with Plant's specifications is installed and in regular use, rate per kwhr will be 1¢ for energy used in excess of 150 kwhr per month, to be limited to 8 kwhr per gallon of hot water heater storage capacity. Plant will install, operate and maintain control equipment.

CONTROLLABLE ELECTRIC SPACE HEATING

Where main source of space heating is electric space heating equipment and the customer elects to control demand of the heating circuits during hours specified by Plant, suitable control apparatus will be installed, operated and maintained by Plant. The excess capacity charge will be based on highest 15-minute demand registered during the controlled periods.

EXCESS CAPACITY CHARGE

Where monthly consumption for dwelling unit for uncontrolled service exceeds 300 kwhr per month for six consecutive months, Plant reserves right to install a demand meter which will register the highest 15-minute kilowatt demand occurring each month. Where the measured demand exceeds 5 kw, there will be added a charge of $1.50 for each kilowatt by which the maximum 15-minute demand in the month exceeds 5 kw.

MINIMUM CHARGE

$1.25 per month per meter plus excess capacity charge, if any.

TERMS OF CONTRACT

Open order.

Go Modern —Go All-Electric!

If you use more than 100 kilowatt hours of electric service in your home each month, you'll get immediate benefit from the new low promotional rates. Check to see where your present monthly electric bill fits into this schedule of typical billings:

If you use more than 100 kwhr per month

Monthly Service	Old Rate	New Rate
132 kwhr	$ 5.00	$4.95
*172 kwhr	6.00	5.85
212 kwhr	7.00	6.75
253 kwhr	8.00	7.67
303 kwhr	9.00	8.77
353 kwhr	10.00	9.52

See How Your Savings Mount Up!

* An electric hot water heater earns you even greater savings—you may pay as little as $.01 per kwhr.

•

If you use less than 100 kwhr per month

Monthly Service	Old Rate	New Rate
45 kwhr	$2.00	$2.58
70 kwhr	3.00	3.33
95 kwhr	4.00	4.08

•

Notice that your savings begin as soon as your monthly use of electricity passes the 100 kwhr mark!

If you keep on using less than 100 kwhr monthly—at most, electric service may cost about 2 cents daily more than before. But if you invest in additional economical and convenient electrical equipment—like an electric range or water heater—you promptly begin to save money on the new low rates for larger use of electric service!

You couldn't find a better time to "Go All-Electric" than now—nor a better place than Taunton, the City of Cheap Electricity!

RESIDENTIAL RATE in final form (left) recovers from low-use customers much of the non-energy cost of serving them. Also (above) it encourages larger usage by reduction of unit price.

What Control Is Best for Switched Capacitors?

Capacitor switching is on the increase. Its effectiveness depends on the type of control used. Here the authors compare various types, discuss their advantages and limitations

R. L. TREMAINE, Central Station Engineering

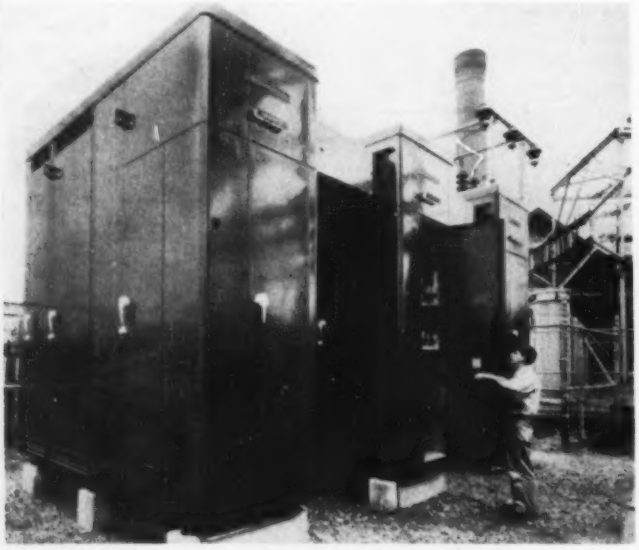
W. H. CUTTINO, Switchgear-Distribution Apparatus Engineering Dept, Westinghouse Electric Corp, East Pittsburgh, Pa.

In the last 20 years, the kvar of installed capacitors on utility and industrial circuits in the United States has increased from 0.01 to 0.25 per kw. This ratio is expected to increase to 0.5 kvar per kw in the next 15 years. Usually the minimum kilovar load—about 0.3 kvar per kw—can be supplied to distribution feeders by installing fixed capacitors. But above this minimum, more kvar must be supplied from switched capacitors.

Since many utilities have already completed their fixed capacitor program, greater emphasis is being placed on switched capacitors. Installations of switched shunt capacitors range from 230-v distribution circuits to 115-kv transmission circuits and can be directly connected to 230-kv transmission lines.

Voltage Control . . . The most common types of control of switched capacitors are those based on voltage. A contact-making, voltmeter-type of voltage regulating relay is used to initiate the switching operation. In addition to a voltage sensitive element, time delay must be incorporated into the control circuit to prevent excessive operation of the switching equipment.

A simple inexpensive form of voltage control is a device in which both the voltage relay and the auxiliary close-trip relay are mounted in a single weatherproof, socket-type case similar to that used with watthour meters. The voltage sensitive element in this relay is a conventional induction disk contact-making voltmeter. This device generally is applicable to feeder circuits where narrow band width settings are not required. It is intended for small single-step capacitor installations where it is desired to keep cost and complexity to a minimum.



METAL ENCLOSED, throat connected 2700-kvar bank of three 900-kvar steps which are switched by voltage control. Units of this type are generally used for voltages up to 13.8 kv

Voltmeter Relays . . . On large single-step and all multi-step installations, solenoid-operated, balanced-beam, contact-making voltmeter relays are used. There are two general types. They are alike in that the moving contact is attached to the balanced beam, which moves up or down in response to a change in circuit voltage, and the two stationary contacts are adjustable to vary the travel of the moving contact. They differ in the means used to adjust compounding and band width. Separate time-delay devices must be used with this type of relay.

There are four separate and distinct voltages, illustrated in Fig 3, which are important in the setting of balanced-beam voltage relays. They are the "raise-make," "raise-break", "lower-break", and "lower-make" voltages in ascending order. These are the voltages at which the raise and lower contacts open and close. The difference between raise-make and lower-make voltages is known as band width. The difference between the raise-make and raise-break or lower-make and lower-break voltages is referred to as compounding or seal-in voltage. The difference between the raise-break and lower-break voltages is usually referred to as the dead band width.

Selecting Band Width . . . Several factors should be taken into consideration in selecting band width. The most fundamental is that the voltage change produced by one switched capacitor step should not exceed the dead-band voltage. Inertia overswing can cause excessive operation if the dead-band width is not greater than the voltage step. Another consideration is the variation in source impedance due to system switching opera-

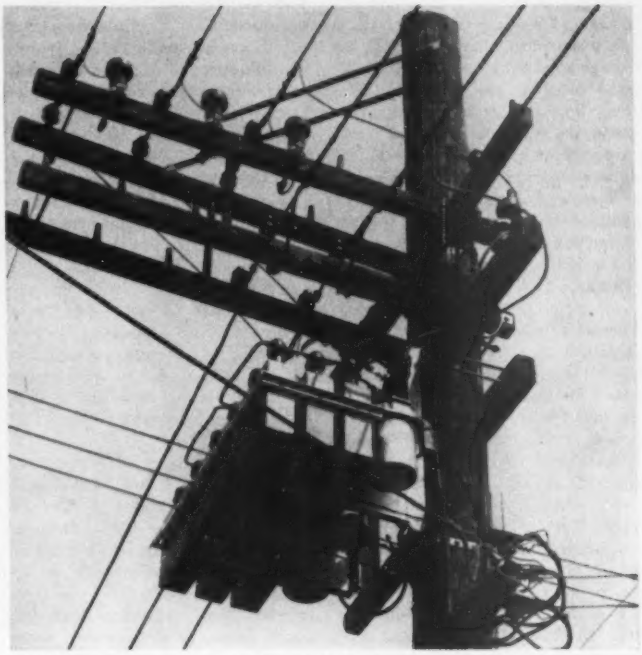
tions which will affect the voltage change produced by a capacitor step as shown in Fig 1. The band width is normally based on the voltage step under the worst probable switching condition. The desire to obtain narrow band width should not result in reducing the compounding voltage below a minimum value. Sufficient compounding must be provided so that good contact pressure is obtained, or burning or frying of contacts and radio interference might result.

Time delay must be used to reduce the number of unnecessary breaker operations, and hence it is desirable to make it as long as possible. The time may be anything from a few seconds to a few minutes. It should be selected so that it is greater than the longest momentary voltage change at the capacitor location for which a capacitor switching operation is not desired. When other regulating devices are involved, the time delay should be coordinated with these devices.

Time Switches . . . Frequently it is desired to operate a bus at two different voltages. This can be done by means of a time switch which changes the voltage setting or "recalibrates" the voltage relay. This is done by inserting a resistor in series with the voltage relay operating coil for the higher voltage setting. A timer with a 7-day dial or one with a 24-hr dial and an omitting device can be used.

One of the methods of controlling reactive "generation" is through the use of time switched capacitors. Switching or unusual load conditions might result in excessive voltage if only time control is used. To mitigate this danger a wide band-width voltage relay is generally used so if voltage becomes too high or low, capacitors can be switched by voltage control.

Line-drop compensation . . . Generally the voltage at a feeder bus is not so



POLE MOUNTED, factory assembled, switched capacitor for distribution circuits. Unit was installed without disturbing other circuits in 1 hr. Hoist work took extra hour.

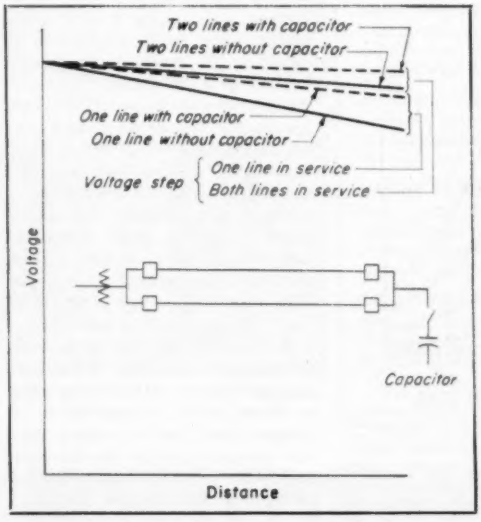


FIG 1—SOURCE IMPEDANCE affects the voltage step produced by switching one capacitor bank. In this illustration, the source impedance is changed by switching out one of two parallel feeders supplied from a voltage regulated bus

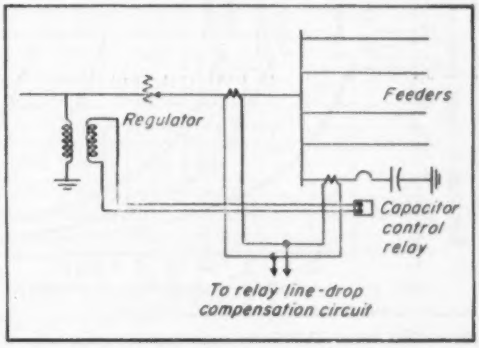


FIG 2—TOTAL FEEDER CURRENT is obtained for line-drop compensated voltage-control relay on regulators. A similar circuit can be used with line-drop compensated voltage-control

important as voltage at the customer's location. Line-drop compensation offers a simple solution for keeping the voltage constant (within the limits of band width) at the customer's location. By means of line-drop compensation, the voltage at the bus is raised to compensate for line drop in the same manner as is done with induction or step regulators. Essentially constant voltage at the end of the feeder can be obtained if the power factor of the load remains reasonably constant.

Current Control . . . On regulated feeders, voltage is not a satisfactory signal for capacitor switching. Where only a single capacitor is to be added to the feeder during heavy load periods, current control can be used if excessive voltage cannot occur. Current control can be used where heavy seasonal or large intermittent loads, that are either on or off, are encountered. Such a load often requires a single bank of capacitors which must be automatically connected and disconnected with the load. In this application, current control can be used to switch the capacitor bank when the current which is supplied to the load exceeds a given value.

Kvar Control . . . When it is desired to keep the kvar supplied over a given line to a minimum in order to reduce system losses and voltage drop and to release generating and transmission capacity, more than one switched capacitor step is generally used. The kvar supplied to a bus can be measured; and when they reach a given value, the capacitors are switched to keep the kvars within prescribed limits. Obviously, the kvar must be measured on the supply side of the capacitors.

Power factor is not a very satisfactory means of controlling switched capacitors. A desensitizing device is required at light load to avoid pumping if the number of switching steps is to be kept reasonable.

Multi-step Switching . . . When more than one capacitor switching step is used at a given location, devices are provided to establish the sequence of the switching operations. Capacitors are normally switched "off" in the reverse order to which they are switched "on." In a few cases this might result in considerably more operations on one switch than another. In such cases a sequencing circuit can be used to equalize the switching duty.

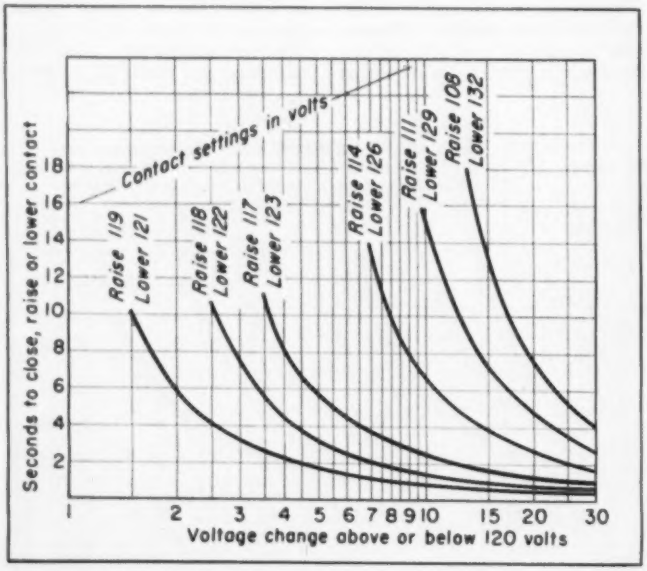


FIG 4—TIME DELAY CURVES for socket-mounted voltage relay. Similar curves apply to other initial voltages. When applying relay, a graphic record of voltages at proposed location should be taken. The expected number of operations can be estimated by comparing operating time of relay for its contemplated settings and the voltage changes recorded on the graph

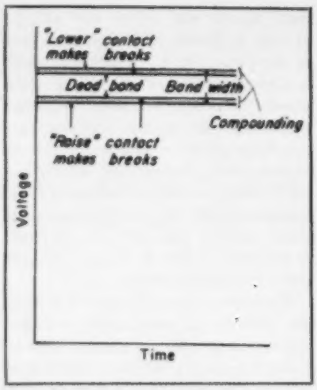
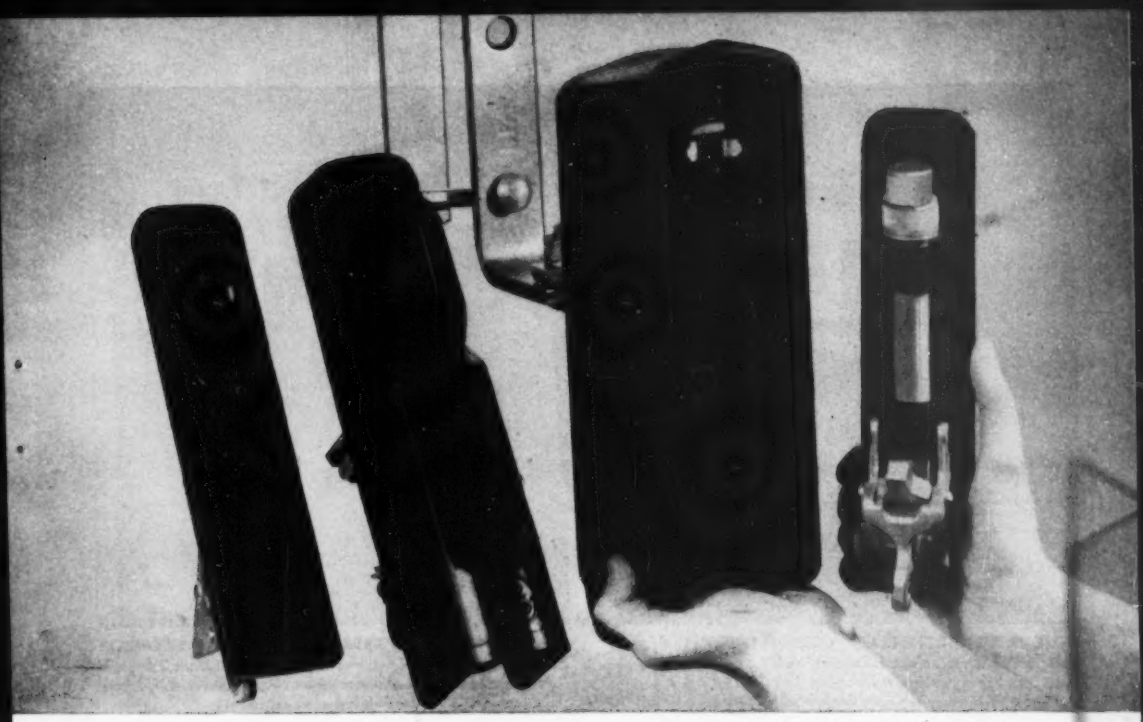


FIG 3—PROPER ADJUSTMENT of voltage regulating relays requires a knowledge of the relationships between the dead band, compounding, and band width voltages

Coordination with Regulators . . . The operation of all means of controlling voltage on a system must be checked to insure first that they will coordinate properly, and second that one does not eliminate the need for another. The former results in unnecessary operation of controls or, in extreme cases, cycling, and the latter is obviously uneconomical. It is not desirable to have the operation of a capacitor bank cause objectionable operations of other automatic voltage-regulating devices on either the source or load side of the capacitors.

When capacitors and regulators are used on the same bus, it is desirable to have the capacitor voltage steps as large as practicable in the interest of economy and to keep the number of breaker operations to a minimum. If capacitors are located on a regulated bus, voltage is not a satisfactory signal for switching the capacitors and current control; time-switch or kvar control should be used. If one or more capacitors are situated near a regulator and the regulator limit switches can be used or modified, they offer a simple inexpensive means of controlling the capacitors that eliminates the problem of coordination. If this is not practical, voltage control from supply side of regulator can be used.

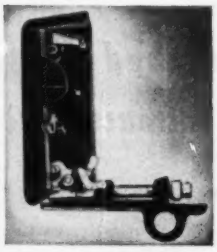
A regulator with line drop compensation for regulating the bus voltage may have a switched capacitor on its bus which is controlled by a voltage signal from the supply side. The capacitor current can be combined with supply current to bus to obtain total feeder current (Fig 2).



Four cutouts in one

by simply changing doors

Indicating



Drop-out

Reclosing

Disconnect

A G-E FEATURE SINCE 1937! By stocking only three interchangeable doors which fit both 5.2- and 7.8-kv, 50-ampere housings, you get the 4 operating functions illustrated at the left. Available also in 100-ampere ratings, this unique flexibility reduces inventory and simplifies stocks.

INDICATING OR DROPOUT WITH A TWIST OF THE WRIST! A small wire yoke, easily inserted or removed, determines whether the fuseholder door "kicks out" at the bottom for visual indication, or drops open—either way giving positive evidence of a blown fuse.

RECLOSING DOOR AVOIDS UNNECESSARY SERVICE TRIP! The two-element reclosing door restores service within one second after a temporary fault blows the first fuse link. By saving a service trip, the two-shot cutout pays for itself the first time it operates!

FLEXIBLE DISCONNECT BLADE CAN'T GET LOST! It's fastened to the door—can't be misplaced. This disconnect blade doubles the continuous current rating of the cutout. When the blade is disconnected and the door closed, the flexible cable extends downward to indicate that the circuit is open.

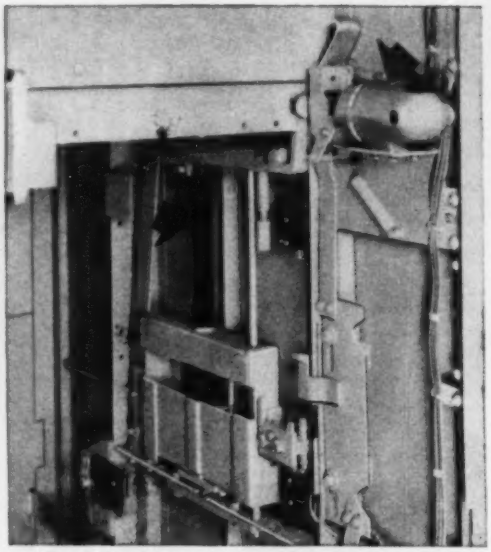
WHAT'S MORE THE CUTOUT IS LIBERALLY DESIGNED—has high dielectric strength, uses silver-plated contacts, provides full-range interruption of fault currents, and is conservatively rated. All live parts are completely enclosed for maximum safety.

For complete information contact your G-E Apparatus sales representative, or write for Bulletin GEA-3448. General Electric Company, Schenectady 5, N. Y.

406-44

GENERAL ELECTRIC

REMOVABLE MAGNE-BLAST CIRCUIT BREAKER features improved flame-retardant insulation and simplified contact design. Breaker operating mechanism and control relay are on the front of breaker for easy accessibility.



NEW FASTER ACTING BREAKER ELEVATING MECHANISM can raise the removable circuit breaker into position, or lower it for testing, in 30 seconds. A new compact gear-motor drives the simplified jack screw elevating mechanism.

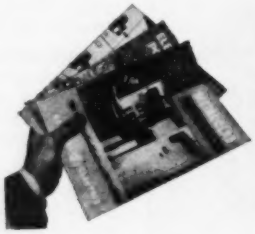
Improved G-E Metal-clad Switchgear

- - - - - - - STRONGER! SAFER! matched to today's demands for more dependable power for increased production

With fast-moving production schedules calling for more and more electric power, General Electric's improved Metal-clad Switchgear, in 4.16 kv and 13.8 kv ratings, answers the need for even greater power circuit protection and freedom from electrical shut-downs.

Retaining all the basic advantages pioneered in earlier G-E Metal-clad Switchgear and meeting all industry standards, this improved equipment offers a wealth of pace-setting design refinements. New features simplify operation and inspection and provide increased safety for personnel. And with stronger, more rigid construction and simplified design of many components, you get even more dependability.

Look over the typical improvements shown here. Then get the complete story from your local G-E Apparatus Sales Office, or write to General Electric Company, Schenectady 5, N. Y.

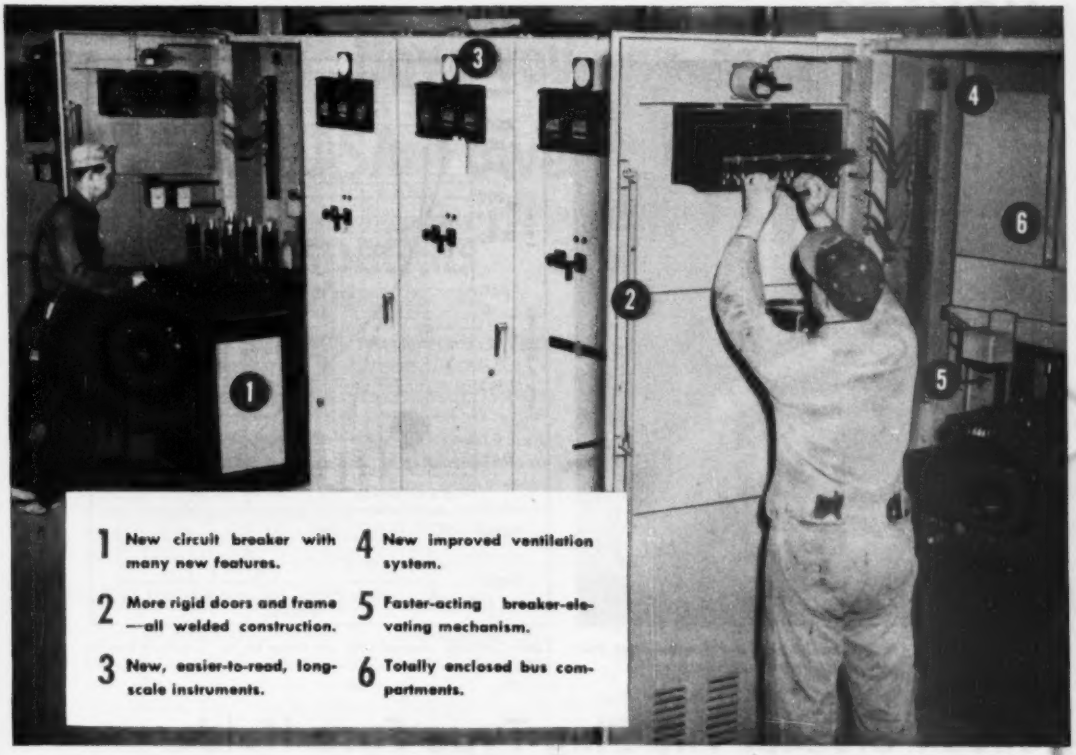


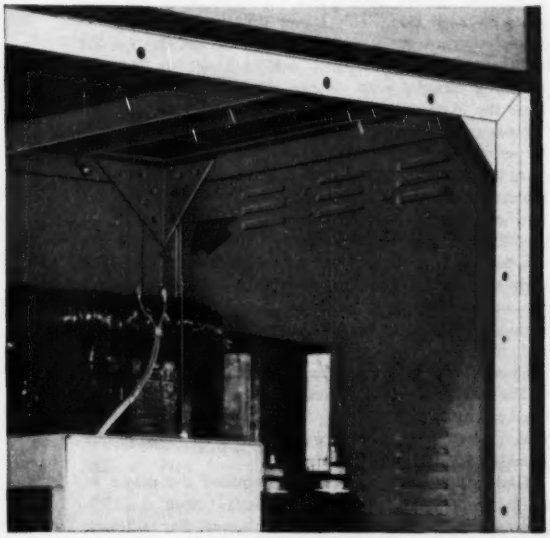
Complete data at your fingertips. Write for these helpful bulletins

Full information on modernizing or expanding your electrical system with G-E packaged equipment is given in these three illustrated booklets. Write for GEA-5664 "G-E Metal-clad Switchgear," GEA-3592 "Load-center Unit Substations," and GEA-5600 "Power for Industry's Third and Biggest Expansion."

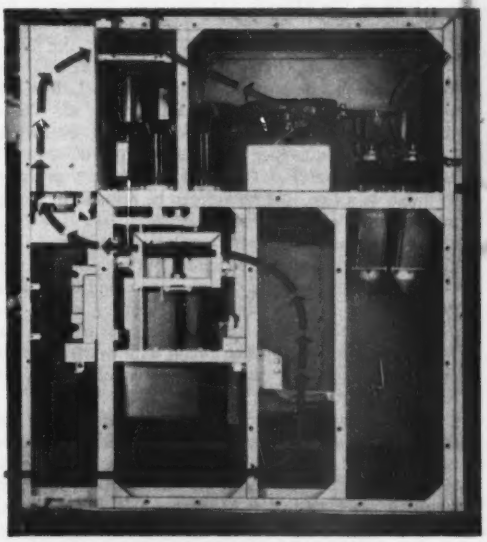
GENERAL ELECTRIC

854-45


1 New circuit breaker with many new features.
2 More rigid doors and frame —all welded construction.
3 New, easier-to-read, long-scale instruments.
4 New improved ventilation system.
5 Faster-acting breaker-elevating mechanism.
6 Totally enclosed bus compartments.

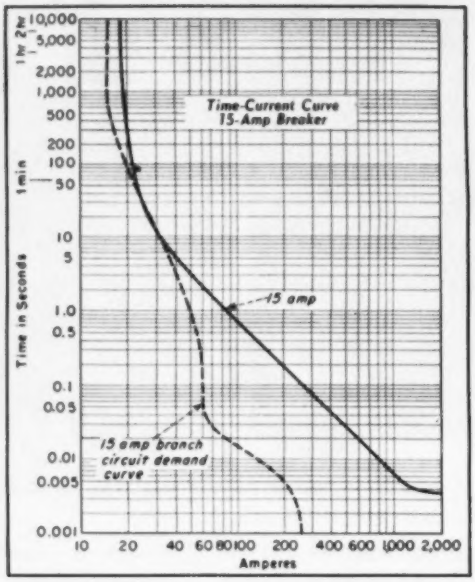


FRAME NOW COMPLETELY WELDED into one solid unit. Gusseted corners (see arrow) provide greater rigidity. Doors have a three-point latch operated from a single handle, and are reinforced against warping by a steel tube at hinge side.



IMPROVED VENTILATING SYSTEM: Arrows show natural draft of air that constantly ventilates entire switchgear unit. The totally enclosed bus compartment, at upper left, is cooled by circulation of air around it.

CIRCUIT BREAKER fits standard fuse holder and is no larger than fuse it replaces. No additional work to equipment is needed



TIME-CURRENT characteristics are shown for the 15-ampere breaker in diagram above. Built in time-lag handles temporary overloads

Circuit Breaker Fits Plug-Type Fuse Holder

RICHARD C. INGWERSEN, Vice President—Engineering, Mechanical Products, Inc, Jackson, Mich.

A new miniature circuit protective device has been developed that can be installed in any standard Edison base plug-type fuseholder rated at 110-125 v ac. Called the Mini-Breaker it requires no additional equipment and no rewiring when applied to circuits of corresponding 15, 20 or 30 amp ratings. A thermal breaker, it is as simple to install as a fuse, and service can be restored by simply pushing in its protruding reset plunger.

In operation, it interrupts excessive overloads and short circuits, tripping instantly on shorts, but with built-in time lag for handling temporary starting loads and line surges. While service can normally be restored by pressing in and releasing the reset plunger, the device is trip free and will continue to interrupt the circuit until overload conditions are corrected. It cannot be held closed on an overload.

Although not a new idea, several factors made the design of this device extremely difficult. Size was limited because it had to be installed like the fuse it is designed to replace. It had to be able to break a circuit and then reclose it again. It had to be inexpensive. Finally it had to meet the requirements of the Underwriters' Laboratories.

The actuating element of the device is a thermostatic bimetal. Current passes through the element which carries one pair of contacts. When the bimetal carries an excessive amount of current, due to a short or an overload, it becomes heated and bends out away from the latch plate on each side. This leaves the plunger free to be forced upward by a pre-loaded return spring. As the plunger moves upward, two extension springs pull the actuating element with its pair of contacts down away from the fixed contacts, thus breaking the circuit. About 10 secs are required to cool the bimetal element sufficiently to permit resetting, if the overload has been severe.

A big factor in the design was the procurement of a molded material for the case that would withstand the terrific pressures built up during a dc short circuit. In addition, the case material had to be able to pass dielectric tests after undergoing ac short-circuit tests, etc. The early experimental molding materials possessed the dielectric and mechanical strength, but could not be used economically. It finally became necessary to develop a special method for processing the commercially-available cold molded inorganic material selected for the case.

The device passed all standard tests for branch circuit breakers except endurance. Since it does not contain a switch mechanism, it was not required to undergo the standard 10,000 cycle endurance test.

Underwriter Laboratories' tests required the device to (1) carry its rated current indefinitely, (2) open at 125% of rated current within one hour, after starting at room temperature, (3) make and break its rating in tungsten filament lamps without tripping or welding of contacts and (4) make and break 1000% rated current at 50% p.f. fifty times for a 15-amp device.

How you can use RM-ASA Power Transformers where "specials" seem to be required

...and get several months faster shipment and up to 8% lower price

Many power transformer applications require voltages, impedances, and tap arrangements which apparently can be provided only by non-standard transformers. Often, you can meet these requirements with G-E RM (Repetitive Manufacture) transformers which conform to the new ASA standards. At the same time, you obtain attractive savings in both time and money. For example, with RM-ASA Transformers...

YOU CAN OPERATE AT NON-STANDARD VOLTAGE:

One optional feature of RM-ASA transformers provides that the high-voltage rating for each insulation class above 5 kv can be varied over a 20% range. This means, also, that by under-exciting you can obtain secondary voltages other than EEI-NEMA Preferred Voltage ratings. There may be some sacrifice in rating, of course—but you will get more kva per dollar than with a special transformer.

Example: You have a standard 34.5-kv primary, but want a non-standard low voltage of 2300. Select an optional RM-ASA rating of 36 to 2.4 kv. Operate at 34.5 kv. You'll get your 2300 volts.

You pay 1% for the optional high voltage. You save 8% in base price. You get faster delivery.

YOU CAN GET ALL TAPS ABOVE OR BELOW THE ACTUAL PRIMARY VOLTAGE:

With RM-ASA transformers, you get two taps above and two below the rated primary voltage. By selecting an optional primary rating, you can get all four taps above (or all below) your actual line voltage.

Example: Your high voltage is 34.4 kv. You want all taps below this. By selecting 32.8 kv for the primary rating, you get taps at 34.4, 33.6, 32.0 and 31.2 kv.

You pay 1% for the optional voltage. You save 8% in base price. You get faster delivery.

YOU CAN PARALLEL TRANSFORMERS WITH DIFFERENT IMPEDANCE:

Impedances of RM-ASA transformers are fixed at 5.5% to 7.0%, depending on high voltage. While this affects division of load when an RM-ASA unit is paralleled with an existing transformer, it is not as critical as you might think. It seldom results in a serious loss of capacity.

Example: You want to parallel a 34.4-kv RM-ASA transformer (impedance, 6%) with an existing unit having an impedance of 6.6%. Theoretical division of load is about 52%—48%. Often actual division will be even better than this because of external impedances. At worst, you have lost less than 5% in capacity. You have saved 8% in cost, gotten faster delivery.

YOU CAN PARALLEL △-Y WITH Y-△

While in most ratings, RM-ASA transformers are available as △-Y or △-△, a △-Y RM-ASA transformer can almost always be paralleled with an existing Y-unit. In fact, there is one advantage: You can ground the high side through the old unit, the low side through the new RM-ASA unit.

YOU HAVE 20 OPTIONS AVAILABLE:

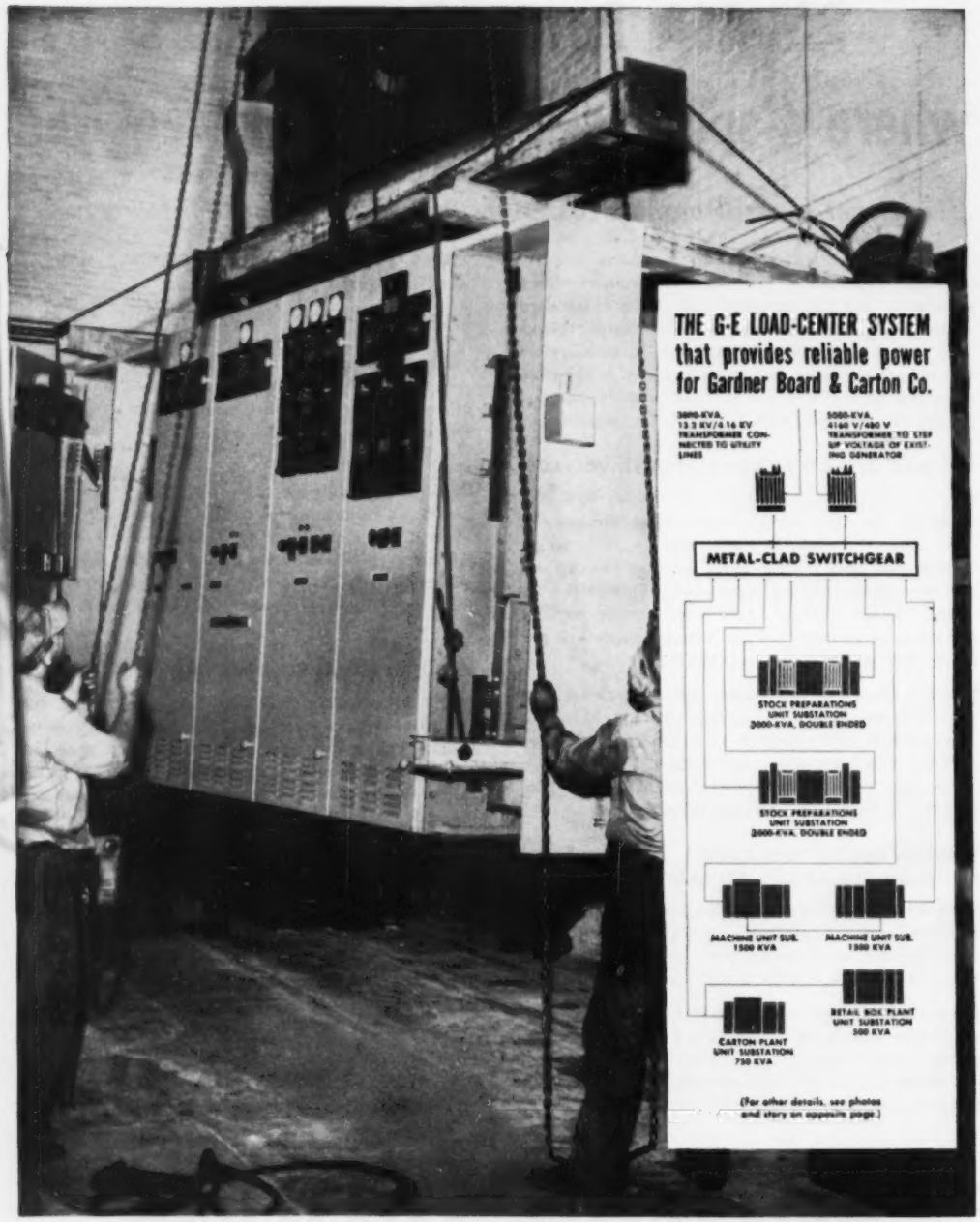
These include: optional primary voltages—load-ratio-control—bushing current transformers—fans or provisions for future fans—junction boxes, and many others. RM-ASA power transformers are available in ratings up to 5000 kva single-phase and 10,000 kva three-phase. The ratings cover all EEI-NEMA Preferred Voltages—high and low—69 kv and below.

Let us help you apply RM-ASA transformers. For additional information, contact your nearest G-E representative. *General Electric Co., Schenectady, N. Y.*

401-33

GENERAL ELECTRIC

Ohio plant avoids shutdowns with


THE G-E LOAD-CENTER SYSTEM
that provides reliable power
for Gardner Board & Carton Co.
3000-KVA, 13.2 KV/4.16 KV TRANSFORMER CONNECTED TO UTILITY LINES
5000-KVA, 4160 V/480 V TRANSFORMER TO STEP UP VOLTAGE OF EXISTING GENERATOR
METAL-CLAD SWITCHGEAR
STOCK PREPARATIONS UNIT SUBSTATION 2000-KVA, DOUBLE ENDED
STOCK PREPARATIONS UNIT SUBSTATION 2000-KVA, DOUBLE ENDED
MACHINE UNIT SUB. 1500 KVA
MACHINE UNIT SUB. 1500 KVA
RETAIL BOX PLANT UNIT SUBSTATION 500 KVA
CARTON PLANT UNIT SUBSTATION 750 KVA
(For other details, see photos and story on opposite page.)

G-E FACTORY-ASSEMBLED POWER EQUIPMENT IS EASY TO INSTALL. HERE MEN LOWER MAIN SWITCHGEAR SECTION INTO PLACE.

G-E load-center power system

Like many other growing plants, the Gardner Board and Carton Co. found they needed more power. They realized, too, a pressing need for more protection against power-failure shutdown than they had with their old-type 480-volt distribution system.

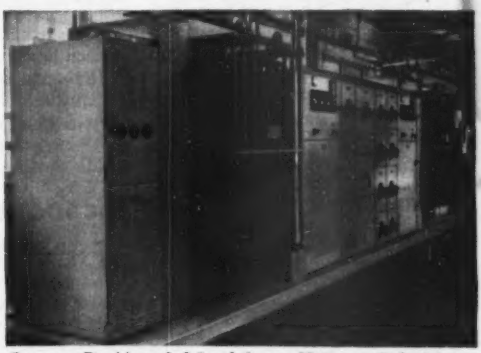
How they did it: With the help of General Electric engineers, Gardner completely replaced their old 480-volt system with a modern 4160-volt G-E load-center system. Compact, metal-enclosed unit substations now give them plenty of power—and plenty of protection against power shutdowns too. A secondary-selective system provides duplicate sources of power for substations supplying the most vital plant loads. Metal-enclosure of all live parts—and modern breakers with plenty of interrupting capacity—give further protection both for production and for plant personnel.

Improves Voltage—Saves Copper—Flexible for Future
By taking high-voltage power directly to load centers, long secondary circuits are avoided, and plant voltage improved. The tons of extra copper that would have been required to expand the old 480-volt system were saved. And the plant electric system now has great flexibility for the future. Additional substations can be added easily, quickly, economically. Existing ones can be easily moved to follow load shifts.

For further information on G-E engineered load centers, call on your local G-E sales representative, or write for GEA-3592, General Electric Company, Schenectady 5, N. Y.

G-E "Project Co-ordination" praised by Chief Engineer

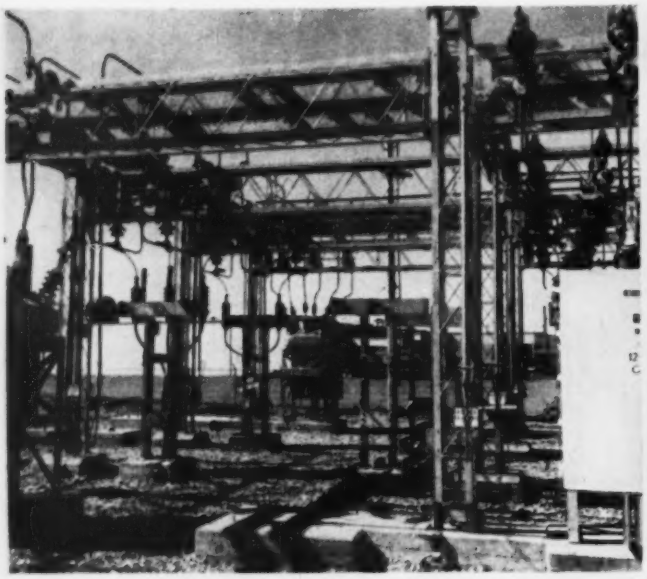
"Many costly man-hours were saved for us by G-E over-all co-ordination," says Arthur Harvey, Chief Engineer of Gardner Board and Carton Co. "From planning to final installation, G.E. co-ordinated all equipment and delivery details whereas Gardner men installed the equipment. The effect on our production during this period was negligible." In photo above, Mr. Harvey discusses over-all plan submitted by General Electric with Mr. J. M. Popp, G-E sales engineer. A simple outline of this plan is shown in chart on opposite page.



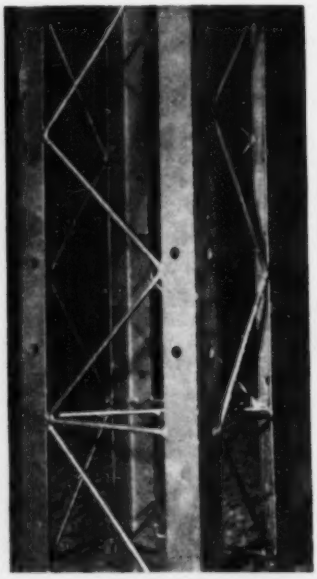
Compact Double-ended Load-Center Unit installed close to load. Ratings: 3000 kva, 4160/480 v. Drawout breakers are easy to inspect, have plenty of interrupting capacity. Note G-E "Interlocked Armor" cables, which provide metal-enclosed circuits with lower material and installation costs.

GENERAL ELECTRIC

SD-78



FASTER ERECTION, BETTER APPEARANCE are two advantages of pre-fabricated shop-welded structural members used by British Columbia Electric in 4- and 12-kv substations. Round steel rods used as diagonal braces cut the weight of steel required by about 12-15%



SMOOTHNESS OF COLUMN SURFACE results from welding bracing rods flush with face of angle iron. Braces give lateral rigidity

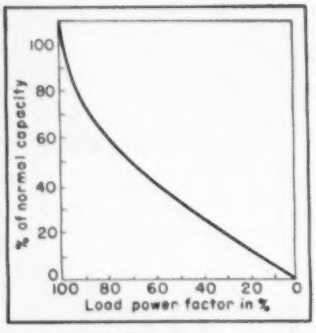
Welded Members Speed Sub Erection

By using shop-welded prefabricated beams and columns, BC Electric has cut erection time for 4 and 12-kv substation structures more than 50%. Use of a few standard prefabricated members of welded construction using rods instead of flat braces streamlines and give a more uniform appearance to the substations. The big saving in erection time, plus the 12-15% overall weight saving offsets the small premium per pound for fabrication of the steel.

The welded members are made up of 2½ x 2½ x ¼-in. angles braced with ½-in. rods on columnar members and ⅝-in. rod on trusses. Columns are made 10 to 20 ft long, 12 x 16 in. or 16 x 16 in. The bracing rods are welded flush with the angle face, and horizontal cross braces give the column lateral rigidity.

Horizontal beams have a rectangular cross section either 2½ or 3½ ft deep by 16 in. wide, and 15½ ft long for 4-kv structures, 18 ft long for 12-kv. Location of the bracing rods is fixed in the shop to accommodate braces on disconnecting switches are to be mounted on the beam. Beams and columns are both drilled in the shop so each type can be used in any required position.

After being assembled and welded in the shop, the members are hot dip galvanized. Initial difficulties with imperfect galvanizing over welds have been eliminated by careful attention to cleaning the weld before galvanizing. Premium for complete fabrication of the members in the shop runs about two cents per pound.



MAXIMUM LOADS curve on a constant current transformer at various power factors

Incandescent Street Lamps Use "Free" Transformer Capacity

FRANK E. REEVES,* Design Electrical Engineer, Ebasco International Corp, New York, N. Y.

Standard incandescent street lamps may be added in series with mercury vapor lights—using the "free" extra capacity of the constant current transformer. This extra transformer capacity is required on mercury vapor light circuits due to their high starting voltages and characteristic low power factor of the ballasts.

In a particular application, 12 mercury vapor lamps required a 15-kw constant current transformer. The lamps consumed only 7.8 kw when in continuous operation. It was possible to add 7.5 kw of incandescent lamp load without overloading the transformer and yet maintain satisfactory performance under all conditions.

Advantage is taken of the fact that

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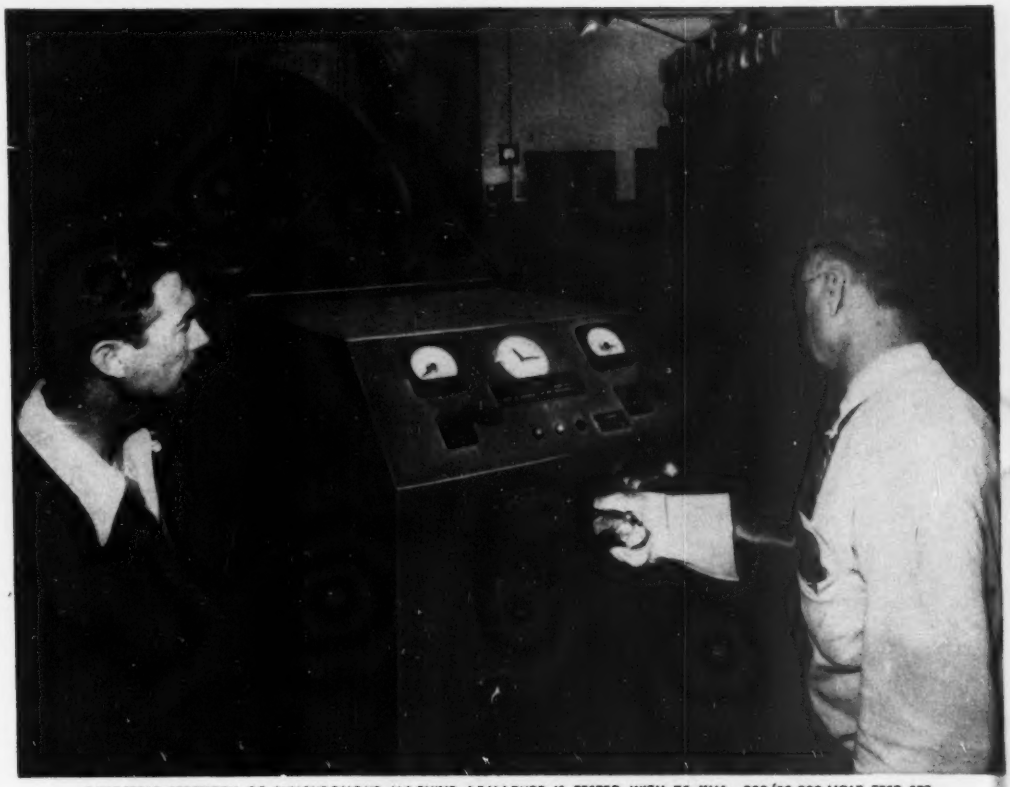


DIELECTRIC STRENGTH OF SYNCHRONOUS MACHINE ARMATURE IS TESTED WITH 75 KVA, 230/30,000-VOLT TEST SET.

High-potential tests simplified

West Coast utility uses G-E portable a-c test set to make a routine job of testing synchronous machines . . . at a substantial saving in time and cost.

When a major West Coast utility overhauls the synchronous machines at its various stations, it checks the dielectric strength of the armatures.

Until recently, this required a large amount of cumbersome equipment that had to be transported from the Test Department to the substations and generating plants. And because the tests involved a complicated arrangement and many connections, specially trained personnel were needed.

Now a more nearly routine job. Today, trained test men make the same tests in practically a routine manner. That's because the utility now uses several General Electric portable a-c high-potential test sets. These compact, self-contained units come complete with all necessary meters and controls, some of which formerly were separate devices requiring assembly and connection for each unit tested. They eliminate much of the hazard of the older method . . . and at a substantial saving in time and maintenance costs. And since each weighs only 3400 pounds, it is easily moved from one location to another.

General Electric portable a-c high-potential test sets can be obtained for practically all testing requirements. They are available in standard ratings from 2000 to 150,000 volts, 0.25 to 25 kva. Higher kva ratings can also be obtained. For more complete information, write for Bulletin GEC-612. *General Electric Co., Schenectady 5, N.Y.*

401-100

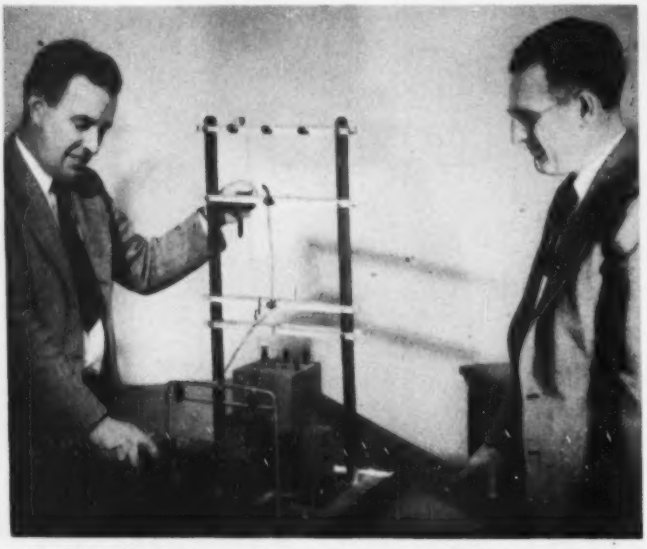
GENERAL ELECTRIC

the cold resistance of tungsten filament lamps is 1/10 to 1/20 of their hot resistance. On the other hand, the cold resistance of a mercury vapor lamp is very high. In starting a series combination circuit, the available voltage will pile up across the mercury vapor lamps providing the necessary high starting voltage. Voltage drop across the incandescent lamps is negligible during initial starting period.

When the arcs in the mercury vapor lamps strike, the voltage across these lamps drops to a low value, permitting a large component of the available voltage to appear across the incandescent lamps. The secondary coil of the constant current transformer moves to the proper position to maintain normal current through the series circuit. Voltages across the two types of lamps are, of course, out of phase. More voltage is therefore available to each group, a further aid to successful operation.

After power interruptions of short duration, the mercury vapor lamps will restart satisfactorily at a lower voltage since they do not have time to cool completely.

For every application, the manufacturer of the mercury vapor lamps and the constant current transformer should be given complete information including the number and type of lamps. He will then be in a position to specify the number of incandescent lamps which can be satisfactorily added to the series circuit.



SUBSTATION MODEL aids in meeting space limitations and railroad crossing problems

Model Aids Designing New Substation

W. S. OXLEY, Manager, Engineering and Construction, Patchogue Electric Light Co, Patchogue, N. Y.

Use of a model resulted in the design of a compact substation for the Patchogue Electric Light Co, and thus was met all the requirements of space limitations, operating conditions and railroad crossing problems. The substation was installed on the same property upon which the new office and service building were built.

Increased load in the vicinity required a substation with a 1500-kva, 3-phase, 23-4.16-kv transformer, necessary oil circuit breaker and regulators. Due to space limitations a model was used to determine appropriate design for minimum clearances. Another factor was the location of the substation with respect to the Long Island Railroad main tracks.

Blocks, representing over-all dimensions of each piece of equipment were cut to scale and positioned for space requirements. It was decided to locate a two pole terminal structure at the rear of the transformer and bring the 23-kv line down the rear of the structure, with copper tubing through the 23-kv fuses and to the 23-kv arresters which were mounted on the transformer. Bus work was then carried to the oil circuit breaker and to a pipe structure that supported the regulator by-pass switches. The regulators, being re-used equipment, had pocket bushings. It was decided to use aerial cable for the leads and return to the terminal structure.

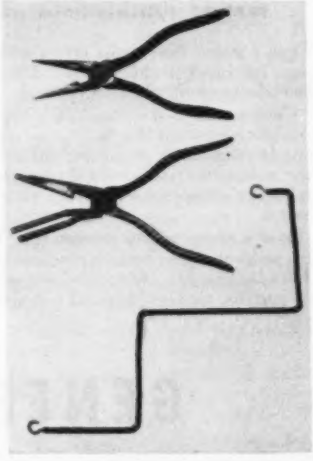
Long-Nose Pliers Modified to Form Coded Wire

ALLEN F. HOTHEM, Meter Dept, The Ohio Power Co, Coshocton, Ohio

Forming bends in No. 12 coded wire used in primary and secondary meter installations is expedited by the tool illustrated. This tool was readily made by modifying the jaws of long-nose pliers. One jaw was shortened and welded to a fork of ¼-in. round-steel rod, and a straight piece of similar material welded to the other jaw.

The tool will make bends of any angle up to 90 deg exactly where desired without overstressing the insulation of the bend. If the spread of the fork is reduced it can also quickly form loops on the ends of wires in two operations. Moreover the plane of the bent section in relation to other sections can be accurately established.

Another application is installation or replacement of switchboard control and relay circuits which utilize No. 10 to 16 wire.



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Electric Welded Steel Tubes

Hot and Cold Rolled Carbon Steel up to 1025 Carbon

Round
Square
Rectangular
Special Shapes

Diameters from ¼" O. D. to 4½" O. D.
Wall thicknesses from .025" to .187"

• If you require Electric Resistance-Welded Steel Tube, we suggest you get in touch with Revere at once. On many requirements, exceptional deliveries can be made. Investigate this source of supply.

Complete facilities are available for further fabrication such as cutting, swaging, bending, annealing, testing, etc.

If you are equipped to do your own fabricating, you will find Revere Electric Welded Steel Tubing has uniform properties and can be readily formed for varied applications.

Over 25 years of experience in the manufacture of Electric Welded Steel Tubes.

Technical and Engineering service is available. Consult us on your Steel Tube problems.

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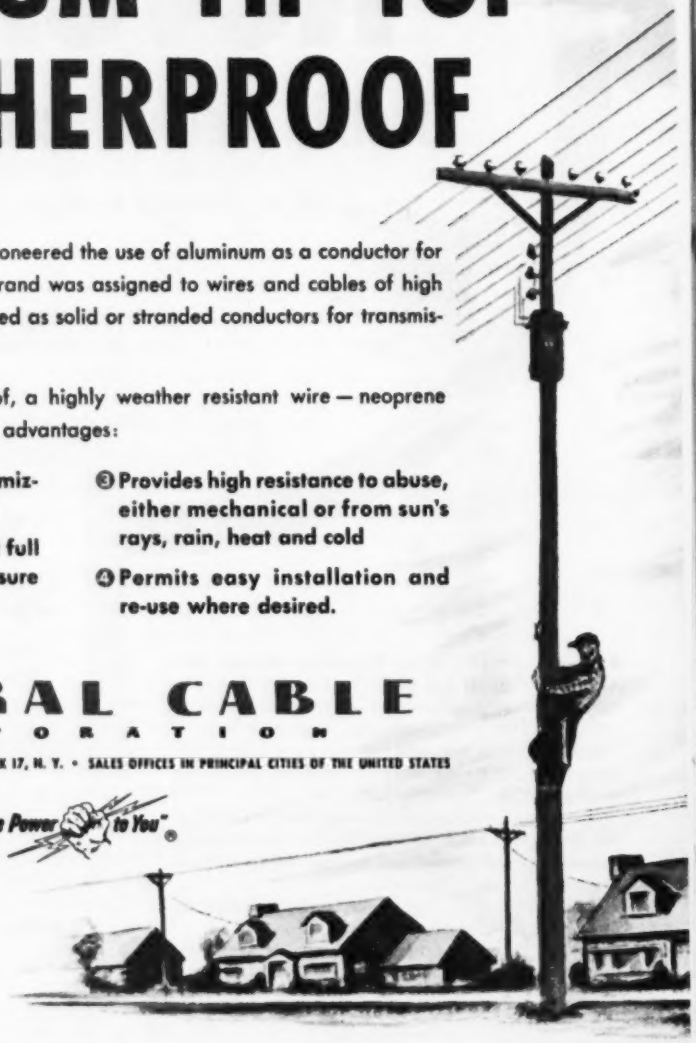
ALEC

ALUMINUM 'TIP-TOP'® WEATHERPROOF

Twenty years ago, ALECTRAL pioneered the use of aluminum as a conductor for all purposes. This General Cable brand was assigned to wires and cables of high tensile strength aluminum, engineered as solid or stranded conductors for transmission and distribution service.

ALECTRAL "TIP-TOP" Weatherproof, a highly weather resistant wire — neoprene jacketed — provides these enduring advantages:

1. **Strips easily and cleanly, minimizing the possibility of nicking**
2. **Clean conductor wires permit full benefit of inhibitors and assure positive connections**
3. **Provides high resistance to abuse, either mechanical or from sun's rays, rain, heat and cold**
4. **Permits easy installation and re-use where desired.**



GENERAL CABLE
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PIONEERS IN ALUM

TRAL
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aluminum experience
and know-how
pays off on
Distribution Lines
INUM WIRE AND CABLE

Voltage Rise Chart for 4-kv, 3-ph Feeders

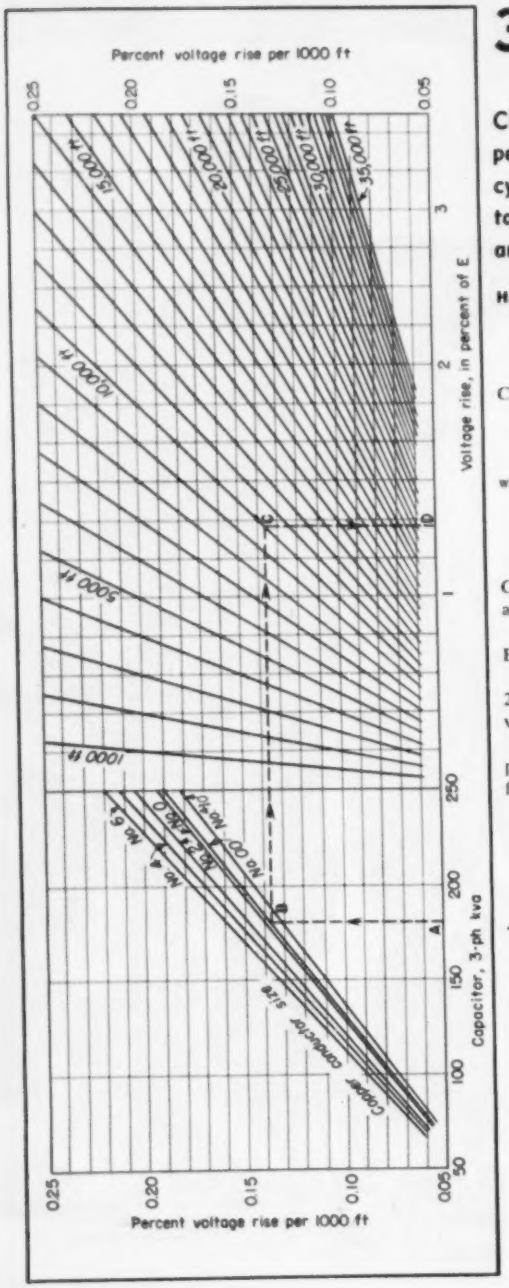


Chart is useful for quickly determining expected voltage rise on primary feeders (60 cycles and 2.5 ft equivalent delta spacing) due to application of shunt capacitors; line resistance is neglected in this case.

HARRY L. SWICEGOOD, Asst. Distribution Superintendent, Brockton Edison Co, Brockton, Mass.

Chart is based on equation:

$$\text{Percent delta E} = \frac{Ckva \cdot x \cdot d}{10\ kv^2}$$

where Ckva = kva of 3-phase capacitor
x = reactance per phase to neutral in ohms per unit length of line
d = length of line
kv = line kilovolts

Correction for difference in line voltage can be made by applying the multipliers in the table.

Example for Use of Chart

A 180-kva, 3-phase capacitor bank is to be located on a 2/0 feeder and 10,000 ft from station. What will be the voltage rise?

Follow the dashed line. Enter the chart at A (180 kva), project up to B (2/0 conductor), then to right to C (10,000 ft line), thence down to D and read 1.373% voltage rise.

Table of Multipliers

Receiver Voltage	% delta E Multiplier
3800	1.108
3850	1.079
3900	1.052
3950	1.025
4000	1.000
4050	0.975
4100	0.946
4150	0.929
4200	0.907

DEAD-ENDING ALUMINUM

is an old story with us . . .

With the advent of the aluminum conductor and its growing acceptance and use during the past few years, we here at Pinco have kept abreast of this gradual change from copper to aluminum conductors by designing our products to meet both present and future industry requirements. Typical of these, are the three new Pinco Strain Clamps shown here which are designed to accommodate either ACSR or All Aluminum in distribution construction.

Yes, we are experienced hands when it comes to clamping aluminum and out of experience such as this, have come the many Pinco products which have been serving the electrical industry faithfully for *thirty-two years*. So if you have a problem, related to clamping aluminum conductor on your distribution and transmission lines, we invite you to PUT IT UP TO PINCO.

FEATURES

- Easy to blanket when working lines "hot"
- Excellent snubbing action, making them "easy" on the conductor.
- "Come-along" eye provided in all three clamps for easy installation of conductor.
- Quadrant type design allows continuous "running" of conductor—eliminates necessity of cutting the conductor at strain points to make "jumper" loops.
- Constructed of highest grade malleable iron, properly annealed and normalized, then hot-dip galvanized.
- Steel U-Bolts and Cotter Bolts, hot-dip galvanized. Spring Brass Cotter Keys.

All three clamps can be used for smaller conductors where a wide range is desired. Liners furnished if required.

PINCO INSULATORS

RIGHT ON THE LINE

The Porcelain Insulator Corporation
LIMA, NEW YORK

Sales Agents:
Joslyn Mfg. & Supply Co.
Offices in
Principal Cities

Low Cost Service Mast Meets Code Clearance

G. M. DOYAL*, Distribution Engineer, Gulf Power Co, Pensacola, Fla.

A low cost service mast has solved the 10-ft ground clearance code requirement and provided a very satisfactory method of connecting services to modern flat roof ranch-type homes. Its neat appearance has gained gratifying customer acceptance and it adds little to the house wiring cost. It provides a more flexible arrangement than any other method tried and is certainly the least expensive from the utility standpoint, which is an important consideration.

While our experience with the service mast covers only a period of 3 to 4 yrs, there are several hundred in use in our territory at this time. There are 106 in one housing project alone. I cannot recall a single case of failure of one of these installations, and some of them have been through winds as high as 75 mph, with direct beach exposure.

The design we recommend to our customers is made from 2½-in. rigid conduit and can be purchased from a Michigan manufacturer for about $26.00, which is a nominal amount.

Although we prefer the 2½-in. mast and usually recommend this size to customers, the 2-in. mast has proven very satisfactory for 3 wire, No. 6 services and for 3 wire, No. 3 services.

We do not have any hard and fast rules or regulations governing the length of service allowable when using the mast, however, we try to limit the length of service drops to the 2-in. mast to 3 wire, No. 6 of 100 ft or less and to relatively short services of 3 wire, No. 3. On the 2½-in. mast we try to limit the length of service drops to 100 ft for 3 wire, No. 6 and 3 wire No. 3 and to 75 ft for 3 wire, No. 1/0.

However, there have been a few service drops of greater length and heavier conductor runs to these masts in areas of relatively little exposure to wind loading with very good results.

SERVICE MAST for modern, flat-roof homes provides inexpensive arrangement meeting Code ground clearance requirements. It has neat appearance and withstands high winds, as high as 75 mph

* Adapted from paper presented at a recent meeting of the Southeastern Electric Exchange.

Machine Shield Protects Both Workmen and Public

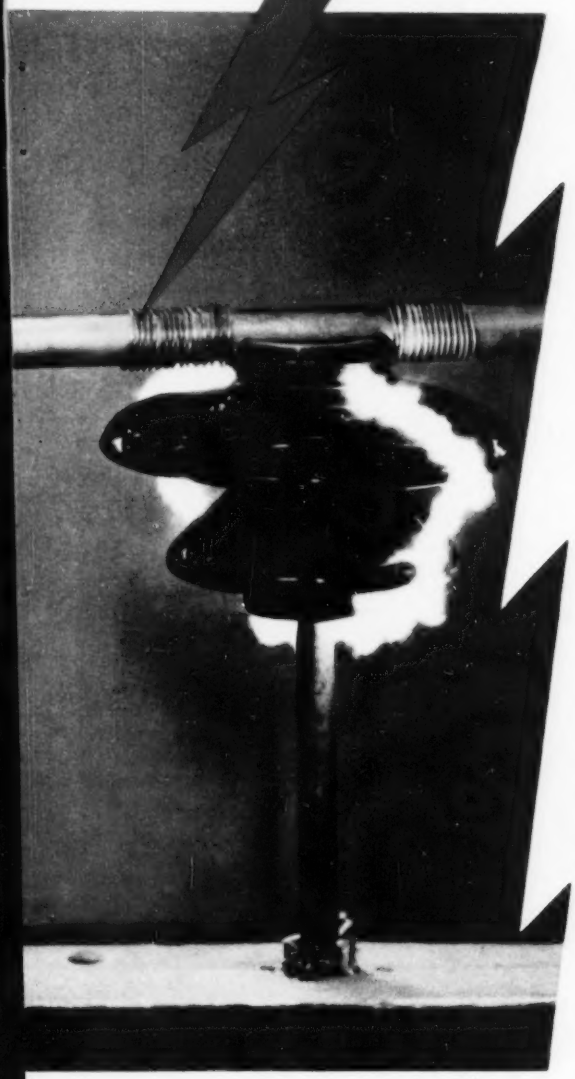
D. C. HAWLEY, Superintendent, Underground Department, Kansas City Power & Light Company, Kansas City, Missouri

Numerous sizeable rocks in the soil in and around Kansas City presented a hazard when men were working in the vicinity of the underground department's excavating machine. Rocks were thrown from the buckets injuring workmen. Also, as the bucket goes around the cleaner at the upper end of the boom the rocks were sometimes thrown into the excavator line and crushed and thrown out with great force.

To overcome these problems a shield was made from heavy wire mesh supported on an angle iron frame and fastened to the excavator boom. The shield raises and lowers with the boom and therefore is always in the proper position. The shield protects workmen and the public.

SHIELD PREVENTS excavator from throwing rocks that might strike workmen or the public

HI-TENSION NEWS *Junior*



Portrait of a Lightning Bolt

Here is a photograph and technical comment from the Ohio Brass Barberton High-Voltage Laboratory: "Test of a sample taken at random from stock of Catalog Number 31623. Electrical Data: rate of voltage rise, 8,000,000 volts per micro-second. Time to flashover approximately 0.08 micro-second. Voltage crest before flashover approximately 650,000 contrasted to normal negative critical flashover of 225,000 volts. It is of interest that two simultaneous flashover paths developed on a single voltage application, although it can be observed that several other ionized paths are being established and would also have flashed in another fraction of a micro-second due to excessive piling-up of voltage."

This test simulates a lightning stroke on the conductor adjacent to the insulator. Such testing has been applied to all models of O-B pintypes and, if necessary, design has been amended to make every style highly resistant to lightning puncture. No insulator the size of a pintype can prevent lightning flashover, but realistic testing and careful design can make such an insulator survive a direct lightning stroke.

Briefly, behind O-B pintype insulators is the sincere desire to do a good job -- and also the finest equipment to back up that desire. This accounts for O-B's service records and, in turn, for the loyalty of O-B users.

Are you taking advantage of *all you can get* in pintype insulators today? It's assured when you specify "O-B."

Ohio Brass

MANSFIELD, OHIO, U.S.A.

B

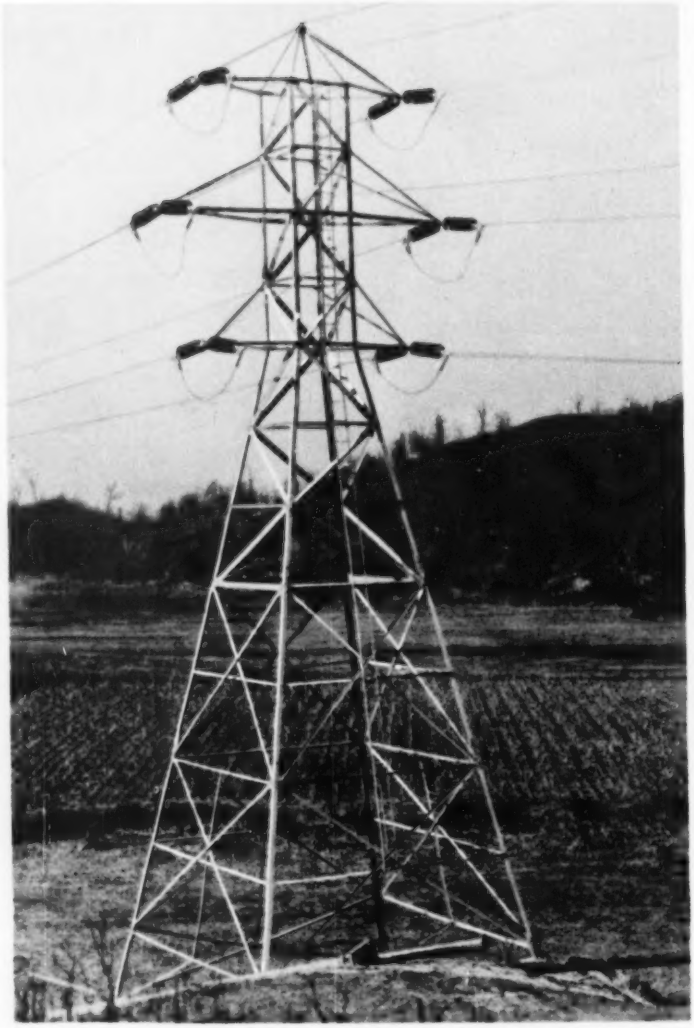
HI-TENSION NEWS *Junior*

–A Way of Staying off Your Mind

Questioned on the matter of insulator maintenance, the operators of this line termed it "negligible." This is worthy of some note, since the line is just about ready to round out 30 years! It's just one more example of how O-B suspension insulators have a way of staying off your mind.

When you specify O-B, you can forget about insulation from then on -- until newer lines come along where you want to repeat this freedom from trouble. Their reliability is the best reason for making . . .

O-B Your Choice of Insulators



These three large single-phase transformer units have recently been completed and shipped by Pennsylvania Transformer Company. Outstanding features of the apparatus, according to the manufacturer, are: "Rating of individual units, 29,000 kva; three combined, 87,000 kva. High voltage, 230 kv. Low voltage, 13.2 kv. Units cooled by a forced oil -- forced water cooling system. Transformers are of shell form construction and designed for upright shipment on a depressed center car with removal of only bushings and safety valves. Included in the list of factors contributing to long, trouble-free operation are . . . "

O-B BUSHINGS

One of the Finest Components of Any Transformer

Ohio Brass

MANSFIELD, OHIO, U. S. A.

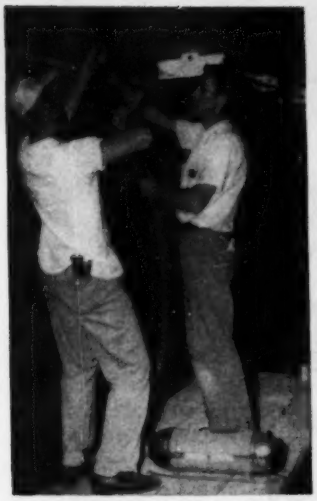
HI-TENSION NEWS *Junior*

Since the growth of power requirements points to the certainty of higher primary voltages, you can forestall the expense and difficulty of revising deadends at some later date by specifying two O-B six-inch insulators at all deadend points -- now! The second insulator installed at the time of original construction will accommodate future load growth by preparing lines for any voltage required later -- up to and including 15 kv.

Ohio Brass

MANSFIELD, OHIO, U.S.A.

4225-H



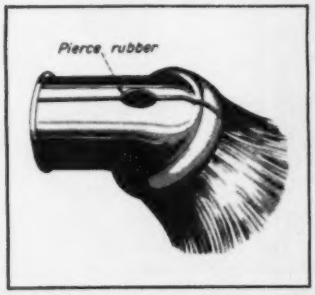
TANK TYPE CLEANER can be used to eliminate dust while drilling

Dust Eliminated In Drilling

C. B. TALLEY, District Manager, Appalachian Electric Power Co, Charleston, West Virginia

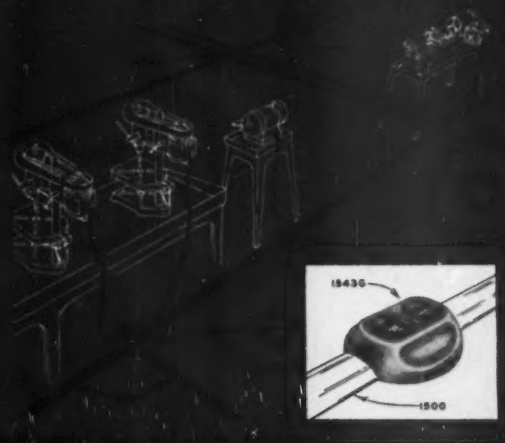
By using a tank-type household vacuum cleaner simultaneously with the drilling operation, a lighting fixture installation proceeded without further delay or inconvenience. The idea was conceived when new fluorescent fixture mounts were being attached to the first-floor ceiling of the Charlestown office building.

As illustrated, small, round, rubber-base vacuum-brush was pierced to permit insertion of the drill. By holding the brush against the ceiling during the drilling operation, the dust nuisance was completely eliminated during the drilling operation.

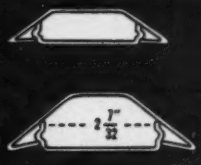


VACUUM BRUSH pierced for drill removes dust during drilling operation

PANCAKE



HERE'S THE DUET!



FLAT AS A PANCAKE...STRONG AS A BRIDGE

THE WIREMOLD COMPANY
HARTFORD 10, CONNECTICUT

THE WIREMOLD COMPANY
HARTFORD 10, CONN., DEPT. D

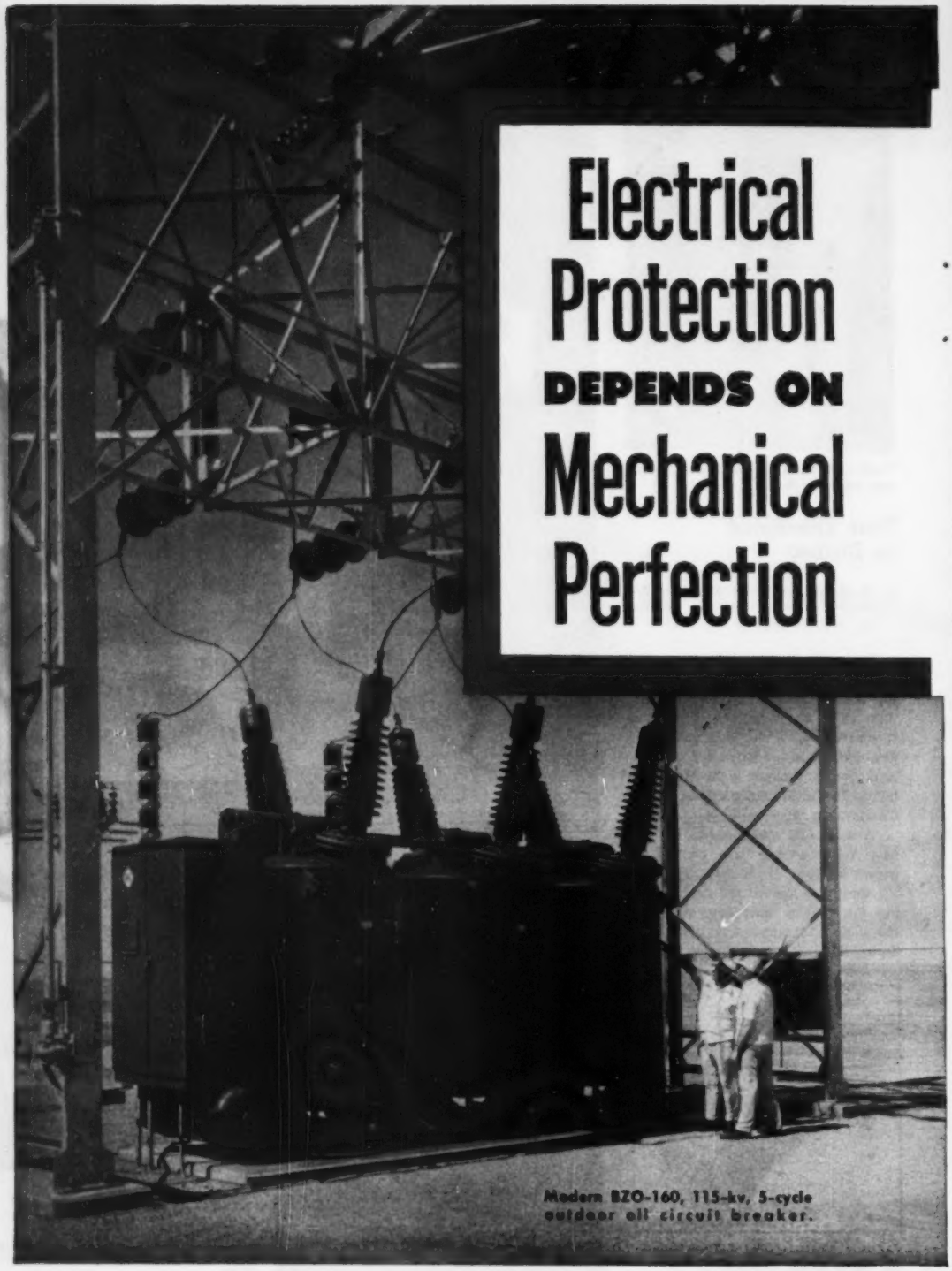
Please send me a copy of the PANCAKE bulletin.

Name _____

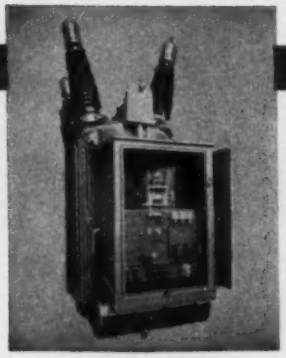
Company _____

Address _____

City _____ State _____

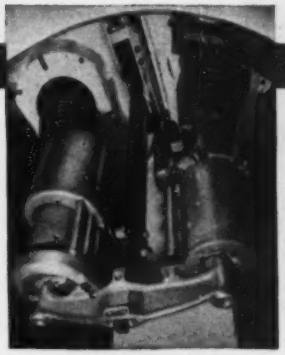


Modern BZO-160, 115-kv, 5-cycle outdoor oil circuit breaker.



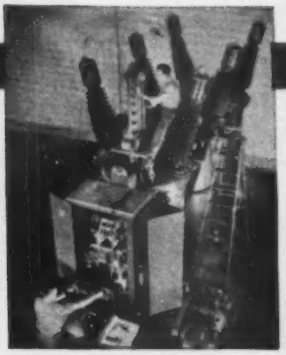
Time-Proved Mechanically Trip-Free Pneumatic Operator

Electrical protection depends on *fast breaker operation under all conditions.* Only mechanically trip-free operation assures this because breaker contacts open independently of the operating mechanism. And such operation provides fast recoupling for immediate reclosing.



Time-Proved *Turbo-Ruptor* and *Turbo-Jet* Interrupting Devices

Electrical protection depends on *fast circuit interruption.* A-C low arc energy devices employ directed oil turbulence for swift arc extinction; self-cleaning, low resistance contacts assure low operating temperature. The result is minimum contact and oil deterioration.



Time-Proved Electrical and Mechanical Pre-Shipment Testing

Electrical protection depends on *unfailing, coordinated operation.* A-C breakers are designed to provide that operation and are thoroughly tested to assure it. Before shipment, electrical and mechanical operation is verified by rigid checks and special test equipment.

Turbo-Ruptor and Turbo-Jet are Allis-Chalmers trademarks.

Type BZO OIL CIRCUIT BREAKERS

Details Contribute to Dependability

Double-hinged, gasketed mechanism housing doors . . . white enameled tank interiors . . . large, hinged tank manhole covers — these and many other details provide easy accessibility for inspection and contribute to the over-all reliability of Allis-Chalmers circuit breakers.

RATINGS

From 69 to 230 kv . . . 1,500,000 to 10,000,000-kva interrupting capacity . . . 5 and 3-cycle interrupting times . . . repetitive reclosing service to meet the industry's fastest requirements.

For more information about these Type BZO oil circuit breakers, ask your nearby A-C representative for Bulletin 71B6022, or write to Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-3743

BERMICO®

THE CONDUIT THAT SAYS

"STOP!"

To LEAKY JOINTS: Bermico's joints fit tight. No joining compound is necessary. It makes a water-tight joint.

To ACIDS: Bermico is highly resistant to all types of soil acids and alkalies.

To SHOCK: Bermico Conduit is engineered to take the shocks and stresses of transport—the heavy loads imposed during installation.

To ABRASION: Bermico's smooth inside bore assures quick and easy cable "pull through" without danger of abrasion.

To SLOW DOWNS: Bermico's convenient 8-foot lengths are light in weight, easy to handle. Cutting and tooling can be done quickly, right on the job. All joints are precision milled for speedy installation. Bermico's complete line of bends, plus 5° angle couplings, enables you to overcome unusual field conditions without delay.

For fast installation and dependable protection specify Bermico.

Distributed by

WESTINGHOUSE

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SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS
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SURPLUS BUSHINGS from modernized 115-kv breakers saved $800 when top parts were used to make one roof bushing

Homemade Roof Bushing Saves About $800

A. M. McCABE, Substation & Val. Supt, Carolina Power & Light Co, Raleigh, N. C.

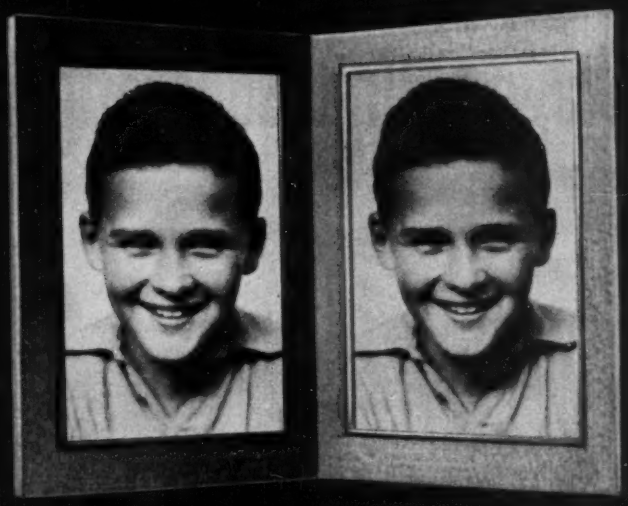
Roof bushings made from old 115-kv bushings removed from circuit breakers due to modernizing, saved $800 each in the cost of new bushings. Also they were made available without delay, whereas new roof bushings would have required a long time for delivery.

Correction Please!

In describing the cable entrance seals in the article by Victor Caradonna, Consolidated Edison Co of N. Y. (Electrical World, April 7, page 156) entitled "Cable Entrance Seal Eliminates Conventional Gasket," the words "left" and "right" should be interchanged in the caption under the diagram.

Some of the old bushings were reused to advantage by buying new transformers without bushings and using the old breaker bushings in these transformers. However, this was a

(*Continued on page* 150)



Identical Twins?

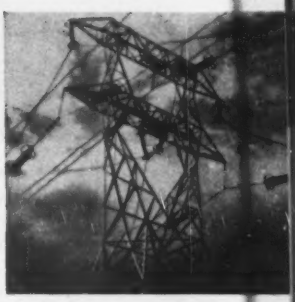
"THERE AIN'T NO SUCH ANIMAL!"

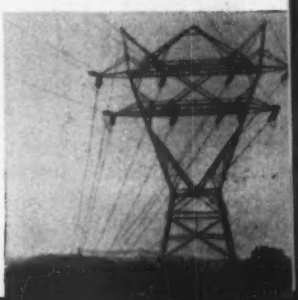
THESE handsome twin brothers may appear identical even to their parents but, should you make a careful physical comparison test, the difference would be more than apparent . . . Similarly, your engineers realize, as we do, that despite close resemblance no two transmission lines are exactly alike—therefore transmission towers supporting these lines must be designed with location and purpose in mind.

Glad to demonstrate how our four decades of experience in building towers for any and all conditions of terrain and load can be applied to your power transmission problems.

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY
2013 Farmers Bank Building, Pittsburgh 22, Pa.

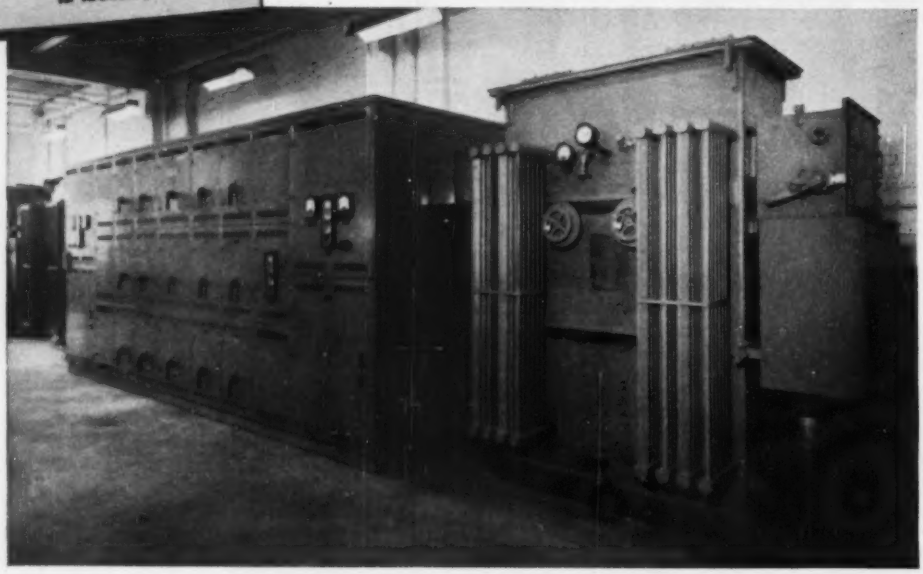
BLAW-KNOX
TRANSMISSION TOWERS



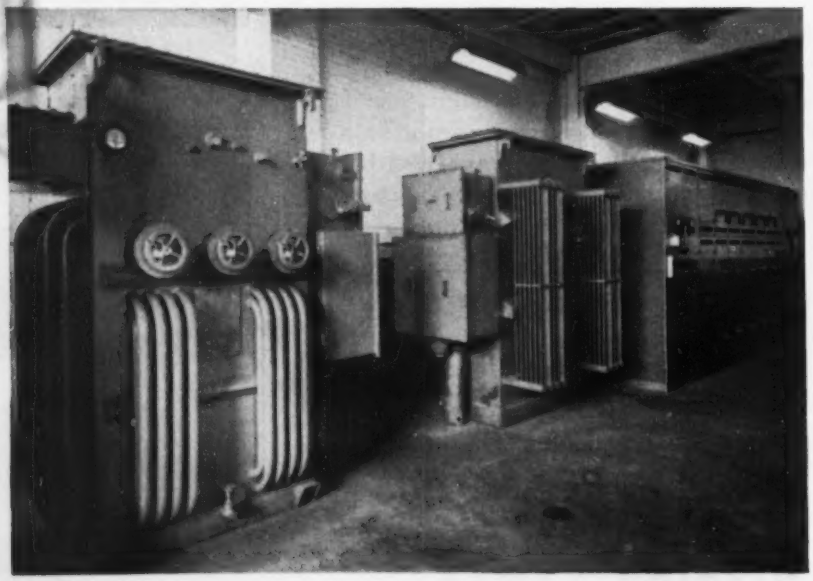


Waãner
TRANSFORMERS
... the choice of leaders in industry

Wagner Unit Substation



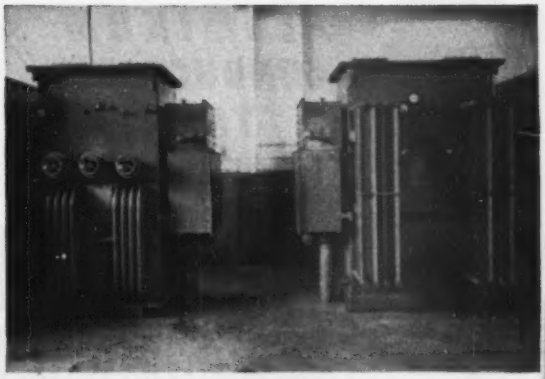
One of the two double-ended unit substations, equipped with 750 kva non-inflammable liquid-filled Wagner transformers.



One of the two single-ended unit substations in this plant. All transformers are 13800 to 240 volts, 3 phase, 60 cycle.

Transformers serve American Tobacco

Two double-ended and two single-ended unit substations furnish power for all operations at Louisville plant.



One 500 and one 750 kva transformer in the twin installation. Bulletins TU-56 and TU-13 give full information on Wagner Dry-Type and Liquid-Filled Substation Transformers. Write for your copies.

Seven Wagner Unit Substation Transformers are used in the load-center power distribution system in the American Tobacco Company plant at Louisville, Kentucky.

The system is formed of two identical installations—each consisting of a double-ended unit substation equipped with two Wagner 750 kva Noflamol transformers, and a single-ended unit substation with a Wagner 500 kva Noflamol transformer. Another 500 kva Wagner transformer is installed in the boiler room of the plant.

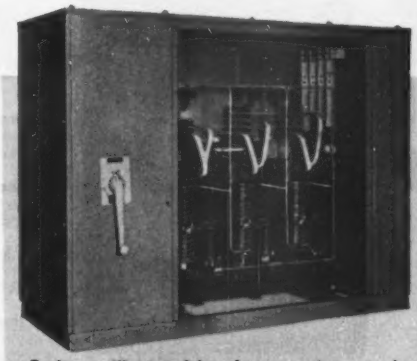
This installation furnishes power for lighting and for all operations, including the humidity control that is so important in the manufacture of cigarettes.

* * *

Wagner Unit Substation Transformers assure a continuous, dependable flow of power. They are carefully designed to meet your distribution requirements. Oil-filled and non-inflammable liquid-filled (Noflamol) transformers are available with various types of entrances and controls for the high-voltage circuits, and with proper throats on the secondary side to connect to any make of switchgear.

Dry-Type Indoor Transformers

Wagner three-phase dry-type load-center transformers are built in ratings through 2000 kva in the 15-kv class and below. Transformer and incoming line section are housed in compact factory-matched enclosures, designed for direct connection to matching secondary switchgear to form a closely coupled unit substation that is streamlined in appearance and affords ready accessibility. Complete enclosure of all equipment assures safety against contact with live parts.



Enclosure illustrated has front panel removed to show core and coils of Wagner dry-type transformer.

Wagner Electric Corporation
Est. 1891

WAGNER ELECTRIC CORPORATION
6456 Plymouth Avenue • St. Louis 14, Mo., U. S. A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

T52-12

NOTHING PERFORMS BETTER WITH ALUMINUM CONDUCTORS THAN

ABW

CAST ALUMINUM

POWER SUBSTATION

TRANSMISSION SYSTEM

DISTRIBUTION SYSTEM

Our Products are Quality Controlled from Ingot to Finished Product

Backed by many years of coordinated electrical, mechanical and metallurgical knowledge and experience in the design and manufacture of cast aluminum electrical products.

Consult one of our nearest 18 representatives or contact our main office.

ANDERSON BRASS WORKS, Inc.

POST OFFICE DRAWER 2151

BIRMINGHAM, 1, ALABAMA

Roof Bushing

(*Continued from page* 146)

slow way of utilizing the old bushings, since we did not want to require manufacturers to build transformers larger than 5000 kva with the additional heights needed to provide internal clearances for the breaker bushings, which are much longer below the cover than present day transformer bushings.

The old bushings saved only about half as much expenditure as if used in transformers, but we still have more on hand than we can use in transformers for a number of years, and we are not happy with old bushings.

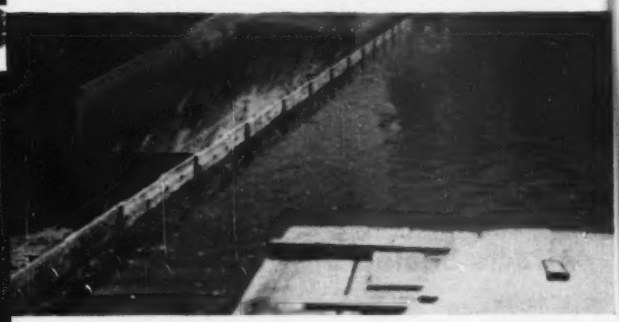
Yoke Makes Pole Moving Easier

A safe and easier way to move poles for road widening projects has been found by the Algoma line crew of Wisconsin Public Service Corp. A yoke (top) holds the base of the pole being moved. In a delicate maneuver, directed by foreman Ed Kemp, far right, (bottom) the line crew moves pole carrying hot circuit.

PENTA preservative performs in "tough spot"

A lot of water has gone over the penta-treated timber in a power company's dam in northern Wisconsin. Yet, in three years of constant service, the 2 x 12 planks in the dam are in sound condition where, previously, it had been necessary to replace them after that length of time. Many *more* years of service are expected from the treated wood. The planks were treated by 24-hour cold soaking with 5% Monsanto Penta preservative in fuel oil.

Monsanto Penta is a stable preservative. As this experience shows, it withstands leaching. It is a uniform chemical that, with correct application, gives dependable results. With proper treatment, penta-preserved wood can be painted or varnished.



For information on the use of Monsanto Penta for wood preservation . . . for names of custom treaters . . . for sources of ready-treated wood . . . contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

PENTA

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

PLEASED PURCHASERS of Cherokee's light-conditioned home, Mr. and Mrs. Elmer Wester, come in the front door and take possession. Note recessed lighting located in entrance alcove and over plantings.

Light-Conditioned Home Attracts Sealed Bids

C. R. TRACY, Iowa Public Service Co, Sioux City, Iowa

More evidence that the salability of a house is increased when light-conditioning is built into it now comes from Cherokee, Iowa. In this city the Iowa Public Service Co interested a local builder, Osterling Construction Co, in the idea of a light-conditioned demonstration home. Determination to purchase the home the minute the demonstration period ended was announced by three different families. Not having put a price on the house, the builder was able to say he would accept sealed bids. Thus the prospective buyers put their own valuations on the house. It was sold to the top bidder for $36,000 and the entire transaction was complete three days after the public showing.

The house is a semi-bungalow type, 40 ft x 57 ft with exterior of clinker brick and wood siding. It consists of a combination living and dining room, kitchen and dinette, three bedrooms, one bathroom, utility and large recreation rooms in the full basement, and attached garage. It was completely light-conditioned according to the home lighting "recipes" developed at Nela Park.

The home was advertised in newspapers, two in Cherokee and ten in nearby smaller towns. These papers also carried a considerable linage of publicity stories. A series of 26 spot announcements went out over the radio station serving the area.

This publicity attracted visitors from 63 surrounding communities as well as from Cherokee. Some came from points in Nebraska and Minnesota and a few from Sioux City, about 50 miles away. A total of 5,556 people visited the home, were taken through in groups of 10 or 12 and given thorough explanation of the outstanding lighting features. Of the total, 229 were in special appointment groups—employees of the builder and of participating firms, and classes in science, home economics, interior decorating and art from local schools. The home was open to the general public 53 hours in nine days during which the remaining 5,327 visitors were conducted through, an average of over 100 per hour.

Observable in the local trade as results from the demonstration home were increased purchases of CLM portables and of "Ozone" lamps, which were shown in the kitchen and recreation room. One furniture salesman remarked that since the demonstration every customer looking at portable lamps peers inside the shade to be sure it is light in color, as was emphasized in the light-conditioning explanations.

Other Uses of Car Cards Stretch Promotion Dollars

CAR CARDS DO DOUBLE DUTY for Sacramento MUD as dealer display cards and (reduced in size) as blotters for direct mail pieces

CARL L. RICHEY, Asst Gen Mgr, Sacramento Municipal Utility Dist, Sacramento, Calif.

To get more value from sales promotion dollars, Sacramento (California) Municipal Utility District is using car cards as dealer display cards and reduced reproductions of them on blotters for direct mail distribution. Standard 11 x 21-in. cards used on local buses for some time are readily adaptable for dealer display purposes after removal of utility signature and phrase "See Your Dealer". Such removal is simple, since the cards are produced by a silk-screen process, and removal only entails blocking out

EASIER SERVICING

Another reason why most control center buyers specify WESTINGHOUSE

Give a man a screw driver and he's all set to go to work on a Westinghouse Control Center. With this simple tool he can open unit doors, remove and replace units, disassemble units, wire units and wire complete vertical structures. And all he needs is ONE screw driver because all screws and parts are accessible from the front.

All men go for the fact that removing and replacing starter units is positive and not a matter of "feel and twist". Guide rails, located on either side of each starter unit, make this a positive operation . . . as simple as opening and closing a filing cabinet drawer.

Then there are those operations that can be performed right on the structure. Each unit can be pivoted forward to the tilt-out disconnect position where it is completely disconnected from the power buses and is "dead".

What about your control center problem? Call in your local Westinghouse application engineer. He will help you work out the details to meet your specific needs. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-27022

YOU CAN BE SURE . . . IF IT'S Westinghouse

CONTROL CENTERS

the words in one process step. Incremental cost of the display cards is only about 29¢ each for four color reproduction, and lithographic reproductions would be still lower in price.

To encourage dealers to use the cards on ranges and counters, cardboard easels are glued to the backs of cards at a cost of about 1¢ each. The card can still be mounted on a wall by leaving the easel unfolded on the back. Dealer acceptance of these cards has been very good.

A reduced reproduction of the car card makes an excellent low-cost mailing piece since the art work and make-up is already available. The 11 x 21-in. size reduces to about 3¼ x 6⅛ in., which fits nicely into a standard No. 6 envelope. Reproduction in the form of a blotter was chosen because: 1) the cost per thousand was only $3 more than printing on coated paper stock; 2) a blotter is more likely to be retained by the recipient than a straight mailing piece; 3) each public contact employee has one of these blotters on his or her desk so that the several thousand people who visit SMUD offices each month for purposes other than paying bills see a reminder on the advantages of electrical cooking.

Names of bottled gas users compiled some months ago by simply having SMUD meter readers note the account reference numbers of electric customers having such installations are used for a mailing list. Thus blotters are not being broadcast indiscriminately in SMUD territory. Contemplated usage of the mailing list did not justify making addressograph plates but some economies resulted from addressing two envelopes at once using hard carbon paper and setting electric typewriter tension at the maximum.

Another possibility being explored at the present time is the purchase at actual cost by appliance dealers of the blotters imprinted with their own name. This would enable dealers to take advantage of existing art work to obtain a promotional piece at lower cost.

Current newspaper advertising uses the same theme as the car cards, so customers see the same feature emphasized as they read their papers, ride the bus, open their mail, or pass by an appliance store. Finding varied uses for the same promotional theme is fully in accord with sound advertising practice which has demonstrated time and again that repetition is frequently the source of greatest results.

Of course, all car cards are not suitable for dealer display nor for the production of mailing pieces. Their occasional use for such purposes, however, is one way that commercial manager R. L. Dunshee has been able to stretch promotional dollars.

General Electric Co

Stands Out at Night

To dramatize their modern building, the Denholm and McKay department store at Worcester, Mass., has floodlighted the limestone facing to approximately 10 ft-c. Store officials obtained permission from the Worcester County Electric Co to use four streetlighting standards in front of the store. Pipe extensions and three-armed brackets were attached to the poles to raise the 12 1,000-watt lights above the marquee.

Virginia Farmers Go for Crop Dryers

L. L. KOONTZ, System Rural Supervisor, Appalachian Electric Power Co, Roanoke, Virginia

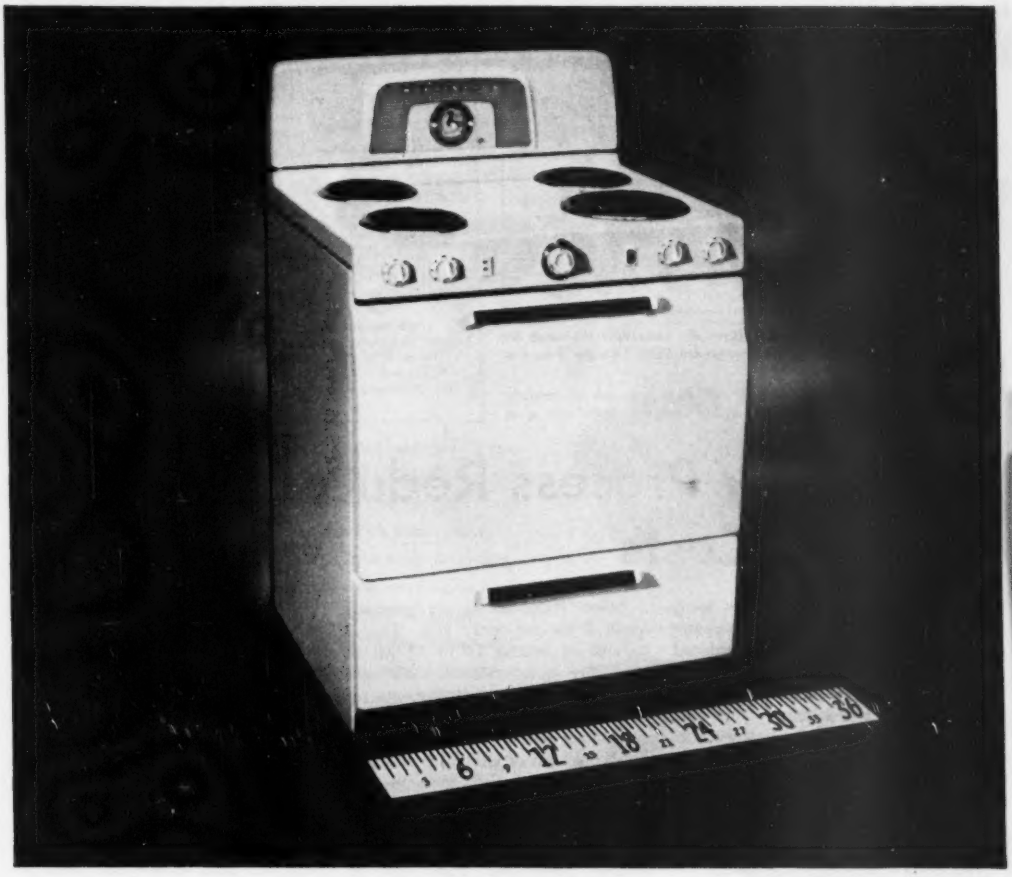
Gain of over 18% in number of crop dryers connected to rural lines of the Appalachian Electric Power Co, was registered in 1951. At the end of the year the total was 369 dryers, as against 312 when 1950 closed. The 57 new installations in 1951 included 28 with 7½-hp motors, 23 with 5-hp, 3 with 3-hp, 2 with 10-hp, and one with 15-hp, making a total of 369, which, added to 2,052.5 at the end of 1950, makes 2,421.5 hp at present. The hp increase also is about 18%.

When first introduced, dryers were thought of for long hay only. Of the 1951 increase, 39 are for this purpose, 16 are for baled hay and two are grain dryers. Many dryers, originally installed and still used for hay, are also drying sacked grain, ear corn etc. One A E P customer is obtaining very good results curing onions with his hay dryer.

They're Buying Adequate Wiring

Over 1,000 coupons, each accompanied by 15¢ in coin or stamps, are received at the office of the National Adequate Wiring Bureau every month. The coupons are clipped from advertisements in consumer magazines and sent in by people who want the offered booklet, "Getting the Most from Your Home's Electric System." Magazines used in the advertising program are, "Better Homes and Gardens," "American Home," "Living for Young Homemakers," and "Small Homes Guide."

Capitalizing on the results of this advertising, the Bureau is now circularizing 8,500 leading home builders. They are being told the Bureau is building public acceptance for wiring adequacy and they would be well advised to incorporate it in their construction plans and then play it up big as a sales feature.



Here's 30 inches of brand new sales power!

A 30" range—a beautiful new addition to Kelvinator's exciting 1952 electric range line that means immediate sales action for Kelvinator retailers. Budget-priced, it's the greatest "little giant" you've ever laid eyes on . . . *big* range performance . . . at a *small* range price!

Look at the style in its streamlined design. Its "Great Scot" oven is great in size and Scotch in thrift . . . it's large enough to roast all of a holiday dinner right along with a big turkey...or to bake 10 loaves of bread. This whopper of an oven has super-fast pre-heat with automatic cut-off—a feature usually found only on much higher priced ranges!

Four high speed surface units . . . each with 7 measured heats. A roomy storage drawer. A convenient appliance outlet. A built-in Automatic Oven Timer that is a part of the streamlined design of the range, not an added accessory.

Yes, here's a brand new electric range that provides real sales power in today's market for alert Kelvinator retailers . . . new proof that Kelvinator is the most valuable franchise in the appliance industry.

THERE IS A BETTER ELECTRIC RANGE...

***IT'S* Kelvinator**

THE MOST VALUABLE FRANCHISE IN THE APPLIANCE INDUSTRY

ELECTRIC REFRIGERATORS, RANGES, FREEZERS, WATER HEATERS, DEHUMIDIFIERS

KELVINATOR, DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT 32, MICHIGAN

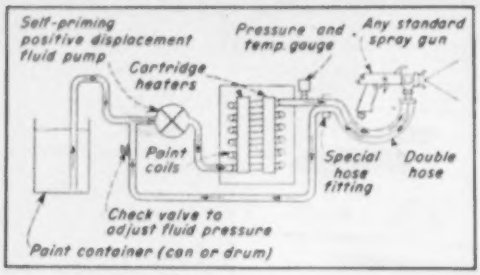


FIG 1—MECHANICS of heating paint are essentially the same for all makes of heaters. Power requirements are about 2 kw per spray gun

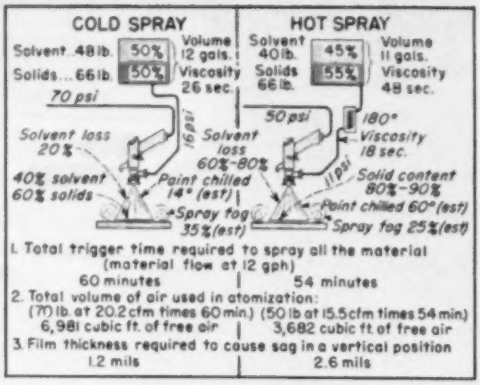

COLD SPRAY
Solvent 48 lb. 50% Volume 12 gals.
Solids 66 lb. 50% Viscosity 26 sec.
70 psi
6 psi
Solvent loss 20%
40% solvent 60% solids
Paint chilled 14° (est)
Spray fog 35% (est)
HOT SPRAY
Solvent 40 lb. 45% Volume 11 gals.
Solids 66 lb. 55% Viscosity 48 sec.
50 psi
11 psi
180° Viscosity 18 sec.
Solvent loss 60%-80%
Solid content 80%-90%
Paint chilled 60° (est)
Spray fog 25% (est)
1. Total trigger time required to spray all the material (material flow at 12 gph)
60 minutes
54 minutes
2. Total volume of air used in atomization:
(70 lb. at 20.2 cfm times 60 min.) (50 lb at 15.5 cfm times 54 min.)
6,981 cubic ft. of free air
3,682 cubic ft of free air
3. Film thickness required to cause sag in a vertical position
1.2 mils
2.6 mils

FIG 2—COMPARISON of hot and cold spray processes by carefully controlled tests shows advantages of hot spray over using cold spray

Hot Spray Process Reduces Painting Costs

FREDERICK J. JOLLY, Industrial Heating Engineer, The Detroit Edison Company

Paint application by the hot spray process results in reduced consumption of paint and thinner; also reduced compressed air quantities and pressure. Baking costs are lower. Fewer man hours are required since hot spray only requires two coats whereas three are necessary with cold spray. The finish is smoother and there are fewer rejects. About 90% of all enamels can be sprayed hot, but lacquers generally require changes in formulation to insure best results.

In the hot spray process the paint is heated prior to spraying so that its viscosity is reduced partially by heat rather than wholly with thinner. There are a number of heaters on the market that can be bought.

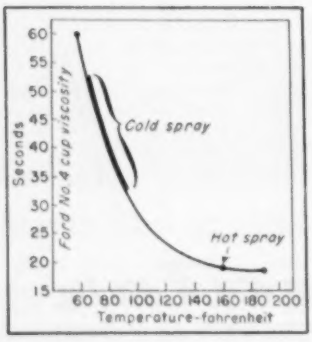


FIG 3—HIGHER TEMPERATURES reduce viscosity of paints. Material is #2527 Glyptal

Power requirements are generally about 2 kw per spray gun. This is capable of heating 10 to 12 gal of paint per hour. Thermostatic control reduces energy requirements for lower spraying rates so that 2 kwhr per gun per hour is conservative. Generally one cent of electricity will save $1.00 in thinner.

Hot spraying stabilizes daily and seasonal temperature fluctuations and simplifies spraying under different weather conditions. Paint can be sprayed at its optimum temperature which in most cases is higher than normally attained even in the hottest summer weather. The higher temperatures reduce the viscosity of paints, Fig 3. Normally this is accomplished by the addition of thinners or solvents.

Decreased viscosity of the hot spray requires less air velocity in the spray gun which results in less fan action of the spray and reduces overspray. This reduces loss of paint and thinner. With regular spraying methods paint and thinner loss amounts to as much as 50%, a considerable amount.

From 16 to 22% of the thinner evaporates when spraying is at room temperature. This evaporation of thinner plus expansion of air in the spraying process has a refrigerating action which lowers the temperature 10 to 15 deg. Even though paint is originally at room temperature it may be at 55 to 60 F when it strikes the work surface. At this temperature paint viscosity is increased. This has an adverse effect on the flow characteristics of the finish on the work being painted.

If paint is heated to 160 F the cooling action of spraying plus thinner evaporation is in the order of 60 deg. This is more than compensated for by the preheating and the paint strikes the work surface 30 degrees warmer than with cold spray. The result is better flow characteristics, no blushing, and better finish on the object being painted.

Thinner loss by evaporation is greater with the hot spray process but this is not objectionable unless thinner is reduced to the point where paint ceases to flow smoothly. Actually less thinner is required to get the desired viscosity at the higher temperature.

Conditions and results of a typical test to determine overall effects of heating are summarized in Fig 2. Conditions of viscosity, air pressure, and fluid pressure were adjusted to give the same rate of material flow for the hot and cold conditions. This is shown by the total trigger time to spray about 12 gal of material. For cold operation 2 gal of thinner were added to 1 gal of synthetic enamel. For hot operation only 1 gal of thinner was added to 10 gal of synthetic enamel.

VICTOR DISTRIBUTION INSULATORS

NOW EVEN BETTER WITH PURIFIED PORCELAIN!

NO. 504
GUY STRAIN

NO. 5 LOW-VOLTAGE
PINTYPE

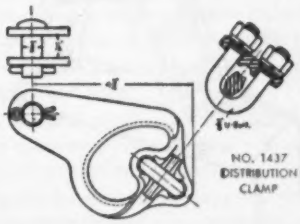
NO. 2012 SPOOL

NO. 804 SUSPENSION

Spools, guy strains, pintypes, suspensions—all are made of the same new *PURIFIED* PORCELAIN as VICTOR's high voltage transmission types. This means that every VICTOR insulator is a better insulator—with highest insulation values, unequalled density, rock-like strength, hardness and resistance to impact, and a product uniformity never before achieved!

Through years of research, VICTOR has eliminated the last big variable in porcelain-making by removing all mineral salts from water used in processing. Results are reduced fluctuations in shrinkage and density and virtual elimination of microscopic, glass-like impurities which, up to now, have prevented maximum insulator strength and hardness. Remember—VICTOR *PURIFIED* PORCELAIN is the finest insulator porcelain ever made!

VICTOR INSULATORS, INC.
VICTOR, N. Y.



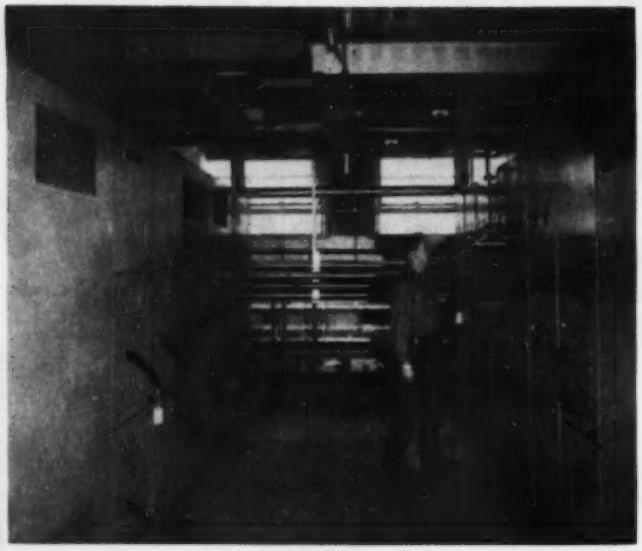
NO. 1437
DISTRIBUTION
CLAMP

DISTRIBUTION LINE HARDWARE

VICTOR carries a complete line of distribution clamps in all required types and materials to accommodate cable sizes from 0.145 to 0.60 inches. Snubbing, quadrant or boltless types in forged steel, malleable iron or pressed steel with or without aluminum liners, according to type and size of cable to be accommodated.

Specify

VICTOR
INSULATORS



Balcony Substations Save Floor Space

Unit substations located on balconies save valuable floor space at Continental Can Co, Mifflin Borough, Pa. Voltage is reduced from 4,000 to 440 v for power and 115/230 v for lighting. Efficient and flexible power distribution is assured by bus duct (shown at top of picture) which is the principal means of power distribution throughout the plant. K. P. Allen, Industrial Power Engineer, Duquesne Light Co, Pittsburgh, Pa.

Maintenance Rig Fits Any Lift Truck

LIGHT SERVICING DEVICE for high ceilings saves time and can be made easily

Here is an easily-made light servicing device for high ceilings that will save maintenance and lamp replacement time. It can be made from scrap material and equipment found around most any shop and is designed to fit any fork or lift truck. A standard step ladder is mounted on an iron plate which serves as a platform and is arranged to slip over the fork lift. Curved iron "shoes," welded to the platform, hold it securely in place. Small blocks attached on top the plate keep the ladder in position. Wheels or small casters and a handle can be bolted to the platform so that it can be more easily moved about the plant. Jack Gibson, Gibson Associates Eng Co, Fort Wayne, Ind.

SEND IN YOUR INDUSTRIAL BRIEF

You'll get more satisfaction from knowing your item helped someone else than from the $5 you will be paid for each item accepted. Give us the basic facts covering the application; the name and location of user; benefits, advantages, and load characteristics of the application. Mail to: Industrial Briefs Editor, Electrical World, 330 W. 42 St., New York 36.

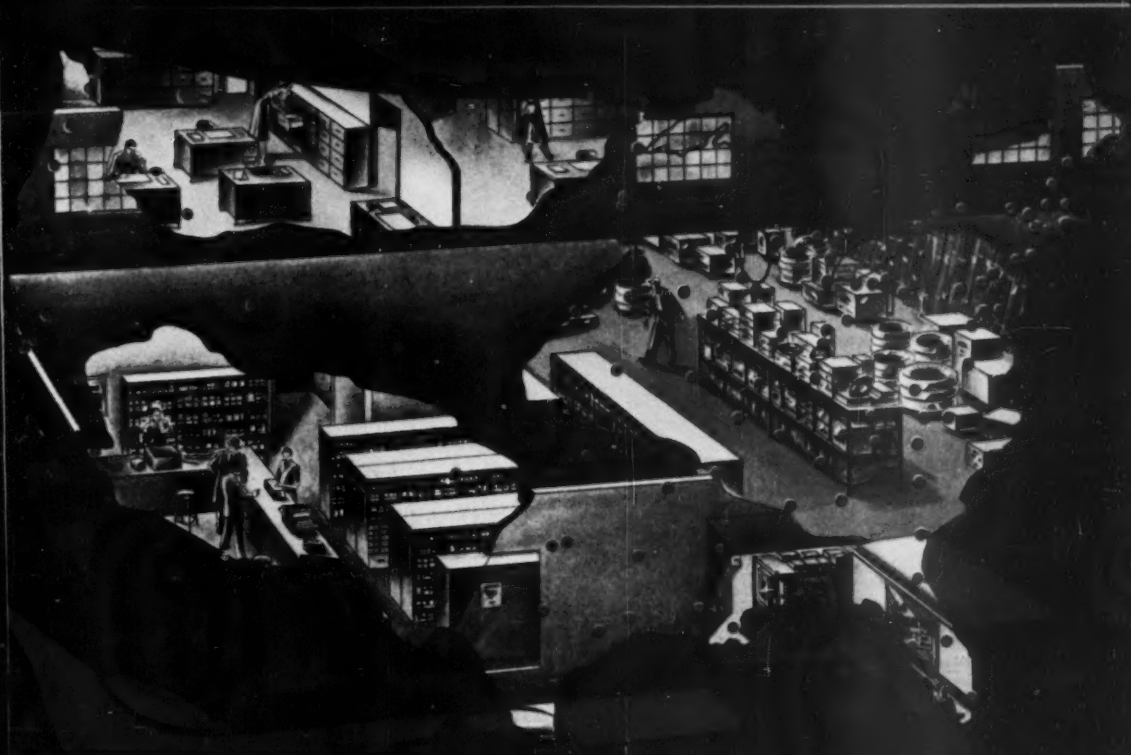
INDUSTRIAL BRIEFS

Tank welding with a new arc welding equipment has reduced finishing costs 30 to 50% at the Cherry-Burrell Corp, Little Falls, N. Y. Welder allows operator to control a continuous flow of filler-metal automatically by finger switch mounted on torch, producing a smoother, less metal-consuming weld—with very few pin holes. Rating is 250 amp. Gun accommodates tungsten from .040 to 5/32 in. diameter and up to 7 in. long. It can be used with either argon or helium. General Electric Co.

Glue drying on TV and radio cabinet wood panels by dielectric heat at the Harry A. Prock Co, Glenside, Pa., cuts drying time to seconds. Combination rf unit with 10-kw generator and a circular conveyor enables complete cycle of forming assemblies on conveyor, applying heat, and removing finished section to be accomplished in less than one minute. Previously, glued sections were placed in clamps and set by atmospheric drying. Firm recently installed second unit. L. Albertson, Application Engineer, Philadelphia Electric Co.

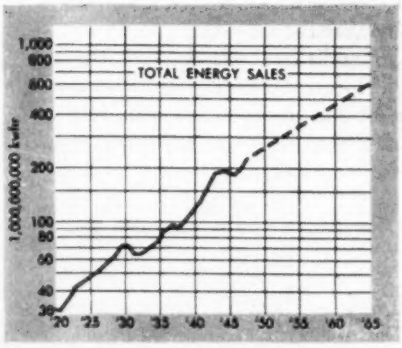
Heating pipes used for outdoor crane trolleys with electric heating cable at the Forge Plant of the Ford Motor Co, Canton, Ohio, have eliminated ice formation and burning of trolley shoes formerly experienced. Commutation has improved and costly maintenance eliminated. Uninterrupted operation of cranes has saved many times cost of installation. Lead covered heating cable is run through 1¼ in. iron pipes which serve as trolleys. Total load in 2,000 ft of trolley pipe is 12 kw. R. H. Masters, Industrial Power Engineer, Ohio Power Co.

Office heating for several out-of-the-way offices at H. H. Robertson Co, Ambridge, Pa., using electric air heaters, provides low first cost, clean and safe heat regardless of outside weather conditions. Long pipe lines required by other types of heating systems considered are eliminated. Each office heater has five 1,000-w strip heaters, designed and assembled by Robertson engineers. E. M. Wenner, Industrial Power Engineer, Duquesne Light Co, Pittsburgh, Pa.



GRAYBAR SERVICE IS NATION-WIDE — No matter where you're located, there's a Graybar office and warehouse conveniently near-by. 105 to be exact . . . from Maine to Florida . . . New York to California—each a headquarters for everything electrical.

Helping you meet today's growing load



HOW POWER UTILIZATION HAS INCREASED. This chart indicates the tremendous increase in power-using equipment of all kinds. Distributor of over 100,000 electrical items, Graybar has consistently sought to expand the use of labor-saving electrical energy through new and more efficient equipment.

When you call Graybar *first* for "everything electrical", you can be sure of service that's tailored specifically to meet the particular requirements of the Power and Light industry — the kind of service that helps you get more power to more customers at lowest cost.

- You get the *fastest possible* deliveries on every order — made, in many cases, directly from stocks in near-by Graybar warehouses.
- You select from among the nation's outstanding product lines — dependable brands you know and respect.
- You can count on the services of capable Graybar Outside Construction Specialists to help you solve unusual pole-line problems . . . to advise on alternates for materials in short supply.
- You get the extra "satisfaction insurance" that's automatic when you deal with Graybar — the result of our long experience and complete understanding of utility needs.

Be sure your next order is placed *via Graybar* — it's the easy way to get everything electrical for pole-line construction and maintenance *when* and *where* you need it. *Graybar Electric Co., Inc. Executive Offices: Graybar Building, New York 17, N. Y.* 254-96

See the following pages for more information about items manufactured by typical Graybar suppliers

4 REASONS WHY RAINIER CROSSARMS belong in YOUR pole-line program

1 **SELECTION** — Extra value in crossarms, as in many other quality products is the end result of *planned manufacture*. With American Crossarm and Conduit Company, careful selection of timber for manufacture of Rainier crossarms is the first important step.

2 **KILN DRYING** — Rainier kiln drying is superior because of scientific control during the seasoning period — correct temperature and the right humidity all the time while in the kiln means all fungus growth killed—timber seasoned throughout.

3 **SEASONING**—Rainier air seasoned crossarms are also carefully seasoned by control of air circulation and by the location of the seasoning sheds, as well as proper piling of the timber during the drying period.

4 **STOCKS** — The American Crossarm and Conduit Company, manufacturers of Rainier crossarms, through Graybar offer the careful buyer of crossarms an additional service — stocks at strategic locations. For planned-ahead buying or for emergencies, this fact is your assurance of lower shipping costs — quicker service.

Remember!

A crossarm produced from improperly or carelessly processed timber might cost less at the time of purchase, but it certainly *is not cheaper per year of life service*.

For further information on crossarms that may pay you dividends in lowered maintenance and replacement costs, write or phone your nearby Graybar Line Construction Specialist. Graybar is located in over 100 principal cities.

AMERICAN · CROSSARM AND CONDUIT COMPANY

RAINIER WOOD PRODUCTS TRADE MARK

The best of everything electrical . . . via GraybaR

Big Enough for You?

You'll see rope like this aboard an ocean liner, or on a big freighter—rarely on a utilities truck. But American Manufacturing Company makes all the pole lines, hoisting lines, hand lines and winch ropes needed for the vast job of keeping our nation supplied with electric light and power.

For more than sixty years American Manufacturing Company has been making rope for farmers, fishermen, ship operators and industry. In all this time "*American Brand*" Pure Manila Rope has been made to the very highest standards of quality. It has earned a universal reputation for uniformity, dependability and service value.

How do you tell "*American Brand*" from other ropes? The answer is: "Look for the red and green markers." These colored yarns are your guide to quality—like the insignia on a car, the brand on a food product, or the tailor's label in a suit.

So, buy rope by brand—buy "*American Brand*". Look for the red and green markers.

American Manufacturing Company, Brooklyn 22, N. Y.

ROPE • TWINE • OAKUM • PACKING • CARPET AND ELECTRICAL YARNS

Branch Factory: St. Louis Cordage Mills, St. Louis 4, Mo.

Sales Offices: Boston • Chicago • Houston • New Orleans • Philadelphia • San Francisco

"American Brand"

PURE MANILA ROPE

The best of everything electrical . . . via GraybaR

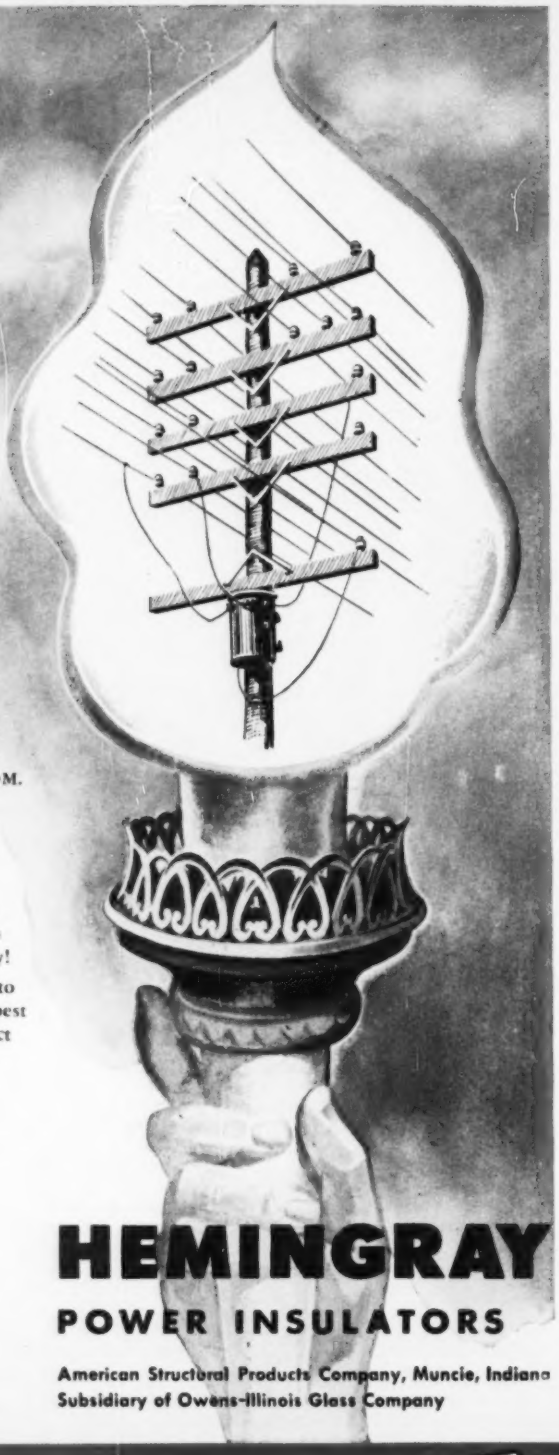
Where does America's POWER come from?

Not the kind of power Hemingray Insulators so ably protect on the power lines. We speak of the strongest force in America . . . FREEDOM. Where does *that* power come from?

You know. Freedom comes from what you do . . . and what we do . . . and what every American does.

So in these troubled and serious times, we reaffirm our belief in and determination to do business the American way—the freedom way!

And for us, that way is to pledge with you to keep America powerful and free—to do the best job we know how—to supply the best product we can make—to price fairly, service dependably and deal honestly with all.



HEMINGRAY

POWER INSULATORS

American Structural Products Company, Muncie, Indiana
Subsidiary of Owens-Illinois Glass Company

The best of everything electrical . . . via GraybaR

APPLETON REELITE

Positive Safety

FOR PLANT AND PERSONNEL

Automatically Takes Up, Pays Out Conductor Cable
Keeps Cord Reeled Up Safely Out of the Way

TYPE "YS" FOR TRAVELING HOISTS

The Appleton Type "YS" Reelite for traveling hoists is built with a swivel base, permitting cord to be fed in any direction. Mounted at the mid-point, a Type "YS" Reelite equipped with 45 feet of cord will serve a stretch of track 90 feet long, straight or curved.

The Type "YS" Reelite eliminates the necessity for exposed current collectors, trolleys or wires. Outer cover easily removed to service brushes and power spring, or to make solderless line connections direct to terminal block. Oil-less bearings at all points of rotation.

RATING: 15 Amperes, 550 Volts A.C.; 250 Volts D.C.

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1703 Wellington Avenue • Chicago 13, Illinois

Field Engineers in all Principal Markets

SEND TODAY for free copy of new Bulletin 504. Fifty full pages describing Appleton Reelites shown here, plus special types and combinations for power tools, air and liquid lines. Or see Sweet's File. Page 2a/Ap.

APPLETON ELECTRIC PRODUCTS

Now... A GREAT NEW APPLETON REELITE

Here's the new, *all new*, Appleton 75 Portable Reelite—an automatic cord reel that takes light right where it's needed, in car-loading, stock-keeping, machine inspection, building maintenance—on hundreds of jobs that require bright, safe, movable illumination. Now equipped to swivel continuously in either direction. Keeps cord reeled up out of the way. Positive stop action holds cord at desired length—re-reels cord when job is done. Available accessories include six types of hand lamps, machine tool connector body or key socket.

CONSTANT DUTY TYPE FOR HEAVY JOBS

Carries smooth, uninterrupted power to moving electrical machines. Automatically winds up and pays out rubber covered cable to cranes, hoists, elevators, lifting magnets, generator sets—heavy mobile equipment of every kind. Pays for itself in efficiency, safety, cable protection.

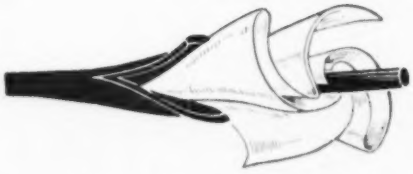
CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

The best of everything electrical . . . via GraybaR

forget about **this**

DURALINE* provides added assurance against power outages caused by moisture, whether in the form of rain or sleet or snow. Duraline won't festoon, is more resistant to damage by foreign objects.

Install Duraline . . .



DURALINE beats the weather in any season. Its exclusive, continuous interlocked fibrous sheath is thoroughly impregnated with genuine URC saturants and covered with URC finishers.

For the full technical story on Duraline with copper, Copperweld or aluminum conductor, just contact your nearest Anaconda Sales Office. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Reg. U.S. Pat. Off.

the right cable for the job

ANACONDA® **WIRE AND CABLE**

The best of everything electrical . . . via GraybaR

with BENJAMIN'S complete line there is no trouble *at all* getting

Task Matched Lighting Installations

In the 400-page Benjamin Catalog, you'll find just the lighting equipment you need to provide lighting that is matched to the task.

No need wasting time trying to locate a source for this or that special unit . . . or figuring out an acceptable substitute. If the unit is needed in industrial and utilitarian lighting . . . you'll be sure to find it in the Benjamin Line!

You'll be sure to find that, not only is the unit you select correct in lighting design, but equally important, it is designed for extra long life operation under the special operating conditions for which it is intended. Whether it be for ordinary industrial use, installation in corrosive, dusty or explosive atmospheres, for indoor lighting or outdoor . . . the Benjamin Unit designed for the task can be depended upon to meet highest expectations for finest performance.—Benjamin Electric Mfg. Co., Dept. K, DesPlaines, Ill.

"MAGNA-FLO" SYSTEMS

Provide Over 300 Combinations for Matched to the Task Lighting.

Like all Benjamin Lighting Systems, the "Magna-Flo" line for use with the three T12 Slimline Lamps is complete! It is so complete because, basically, just three channel sizes and four types of reflectors form the backbone of almost unlimited systems to match any industrial lighting task.

R3930

"VAPOLETS"

For locations with atmospheres containing moisture, non-hazardous dusts or vapors.

Available in three types of reflectors—Dome, Shallow Dome and Symmetrical Angle. These reflectors thread on to the vapolet housing by cast-iron ring. Choice of glass globes: plain, opal, heat-resisting, ruby, etc.

EXPLOSION-PROOF

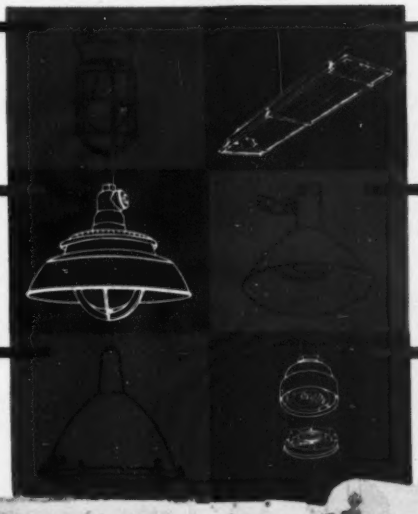
For locations listed by U. L. as Class I, Group C and D hazardous locations.

For lighting locations involving explosive atmospheres or explosive inflammable dusts, there is a complete line of Benjamin Explosion-Proof Units, available in a choice of reflectors, Dome, Flat Cone, Bowl, Symmetrical Angle; also choice of mountings.

"STEELITES"

For locations where keeping lighting levels up and upkeep down is a real problem.

An armor-clad unit consisting of specially designed alzak aluminum reflector enclosed in a protective steel housing and a hinged, tempered glass cover which seals against dust, moisture and corrosive fumes.



"VAPOR-TITE" FLUORESCENT

For lighting locations where excessive amounts of non-combustible vapor or dust are present.

Approved as vapor tight by U. L., a one-piece porcelain enameled unit with hinged glass cover and easily accessible control equipment. Available in standard and angle mountings; also Plexiglass covers.

"ELLIPTO-LITE"

Most popular type floodlight ever designed for outdoor and protective floodlighting.

For protective floodlighting of factory yards and grounds and for lighting outdoor work areas. A porcelain enamel floodlight with auxiliary inner aluminum reflector; available with a removable hood construction, lowering attachment, choice of mountings.

"TURNLOX"

Detachable Hood Construction available with 7 types of Incandescent Reflector Units to speed maintenance and cut costs.

Permits removal of lamp and reflector as one unit for cleaning on floor or at bench.

For complete details on this equipment or any of the more than 2,000 Benjamin Lighting Units CONSULT YOUR BENJAMIN CATALOG . . . the encyclopedia of Industrial Lighting.

The best of everything electrical . . . via GraybaR

"STARTING LOAD ON OUR 40 H. P. CRUSHER MOTOR CAUSED 400 AMP. ORDINARY FUSES TO BLOW . . . BUT NOW 125 AMP. FUSETRON FUSES LET MOTOR START AND GIVE BURNOUT PROTECTION TOO."

Mr. Meeka explains . . .

"We have a crusher driven by a 40 h.p. 250 volt motor. The starting load on this motor is often quite heavy and gave us no end of trouble by causing the 400 ampere fuses protecting the circuit to blow.

"Some months ago, after checking the actual running current of the motor with an ammeter, we decided to see if FUSETRON dual-element Fuses could live up to their claims.

"The ammeter reading indicated that 125 ampere FUSETRON Fuses should be used to give motor-running protection. So, we installed this size.

"Were we surprised—they not only hold the starting current of the crusher motor—but we have the satisfaction of knowing the motor also has burnout protection to back up the overload relays in case they should ever fail.

"Not once since we installed FUSETRON Fuses have we lost a moment's production due to a fuse blowing needlessly."

ED MEEKA
Supt., ROBINSON BRICK & TILE CO.
Denver, Colorado

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

(FUSETRON is a trade mark of the Bussmann Mfg. Co., Division of McGraw Electric Co.)

The best of everything electrical . . . via GraybaR

"FUSETRON FUSES NOT ONLY ELIMINATE USELESS SHUTDOWNS - THEY GIVE YOU 10 POINT PROTECTION."

1. Protect against short-circuits.*
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating—lesser resistance results in much cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels
10. Protect coils, transformers and solenoids against burnout.

*Fusetron Fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December 1947.

DON'T RISK LOSSES

One **needless** shutdown . . .
One **lost** motor . . .
One **destroyed** switch or panel
One **burned out** solenoid . . .

May cost you far more than replacing every ordinary fuse with a Fusetron dual-element Fuse.

MAIL THE COUPON NOW for complete information about the All-Purpose Protection of FUSETRON Dual-Element FUSES.

BUSSMANN Mfg. Co. (Division of McGraw Electric Co.)
University at Jefferson, St. Louis 7, Mo.

Please send me complete facts about FUSETRON dual-element Fuses.

Name_____
Title_____
Company_____
Address_____
City & Zone_____ State_____ 652

The best of everything electrical . . . via GraybaR

BI-SEAL SELF-BONDING ELECTRICAL INSULATING TAPE

BI-SEAL CUTS SPLICING TIME AND COST

- NO STICKY ADHESIVES . . . EASY TO APPLY IN CLOSE CLEARANCES
- NO RIGHT OR WRONG SIDE . . . BOTH SIDES USABLE
- NO TACKY SURFACES TO PICK UP DUST OR FOREIGN MATTER
- WILL NOT TANGLE OR STICK TOGETHER
- REQUIRES NO SPECIAL APPLICATION TECHNIQUES
- CAN BE STORED INDEFINITELY

Here is the *multi-purpose* electrical insulating tape for wire or cable splicing . . . the tape that meets your strictest requirements for many unusual as well as innumerable ordinary applications. BI-SEAL offers you complete and lasting protection against moisture, acids, alkalies, sunlight, corrosion, fungus and ozone. These outstanding characteristics, plus Bi-Seal's excellent electrical properties, make it ideally suited for a broad range of applications in the Communications, Electronics, Public Utilities, Electrical Contracting and Electrical Maintenance fields.

WRITE TODAY for free illustrated booklet, "Insulating Wire and Cable Splices with Bi-Seal Self-Bonding Electrical Insulating Tape."

CHECK THESE BI-SEAL FEATURES:

- Self Bonding
- Moisture Resistant
- Outstanding for Low Temperature Application and Performance
- High Dielectric Strength
- Superior Aging Properties
- Conforms to Irregular Shapes
- Corrosion and Chemical Resistant
- Performs Efficiently on Any Insulation

BISHOP MANUFACTURING CORPORATION

6 CANFIELD ROAD • CEDAR GROVE, N. J.

"Manufacturers of Electrical Insulation Since 1847"

The best of everything electrical . . . via GraybaR

CHANCE 8-WAY EXPANDING ANCHORS

Build lines to stay with the Chance 8-Way!

MEMO

N.T. 5/16/52

+ + =

Here's TWO 4-way anchors in ONE! and there's no wasted area between blades

Tom

CHANCE "P. C." (Protected Connection) CLAMPS

MEMO

P.S. Graybar stocks this new clamp too! Let's check on it—

Tom

Complete Thread Protection
. . . Conductor Protection
. . . Contact Protection

210 NORTH ALLEN STREET, CENTRALIA, MISSOURI
815 TENNESSEE STREET, SAN FRANCISCO 7, CALIF

A·B·CHANCE CO

C52-14

The best of everything electrical . . . via Graybar

users prefer COFFING HOISTS

. . . for multiplying manpower

Wherever a load must be lifted, pulled, skidded, stretched, moved, or bound, there is a right Coffing Hoist to take over the heavy work, speed the job, and in many cases, enable one man to replace a crew.

. . . increased safety

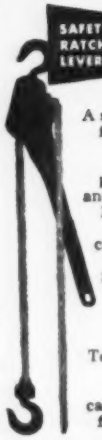
You can depend on Coffing Hoists to protect men and equipment. Each is designed and built to operate efficiently at full rated capacity with a wide margin of safety.

. . . saved maintenance costs

Coffing Hoists stay on the job longer because they require less maintenance attention. Prompt Coffing service and immediate shipment of replacement parts further reduces delays and down time. Down-time costs saved and repair costs saved are profits earned.

QUIK-LIFT ELECTRIC HOISTS

Ruggedly built for the most continuous assembly line use. For long life, all moving parts are sealed, running in oil. For safety, parts are tested at 100% overload. Seventeen models — 500 to 4000-lb. capacities.



SAFETY-PULL RATCHET LEVER HOISTS

A safe, sure lift for any load. Multiplies manpower, protects men and equipment. Dual ratchet and pawl cannot slip or drop load. Safety valve handle eliminates overload dangers. Ten models — 1,500 to 30,000-lb. capacities . . . factory-tested at 100% overload.

HOIST-ALL

A handy all-around tool for hoisting, lifting, pulling. Without its stand, it is an efficient hoist, puller, or load binder. With stand, it becomes a powerful high-lift jack. Two sizes — 2,000 and 4,000-lb. capacities.

SAFETY LOAD BINDERS

Powerful, highly portable, safe. Dual ratchet and pawl hold securely. Handle cannot fly up when released for another "bite." Two models — 3,000, and 6,000-lb. capacities.

CHALLENGER SPUR GEAR HOISTS

All steel, yet weighs only 39½ lb. Formed steel housing resists impact . . . does not crack under shock loads. Back plate is laminated for greater rigidity. Load may be adjusted up or down a fraction of an inch. Hoist hangs true even without load. May be completely disassembled in minutes with ordinary tools. Factory-tested at 100% overload . . . has five-to-one safety factor. Two models — ½- and 1-ton capacities.

MIGHTY-MIDGET PULLERS

Big pulling power in a small package. Light, compact, a Mighty-Midget hangs easily on a tool belt. Handle can be used either as a lever or a high-speed crank. Two sizes — 500-lb. model weighs only 6½ lb., 1,000-lb. model weighs only 9½ lb.

HOIST-BINDER

Ratchet hoist principle allows continuous take-up without releasing hook for new grab. Handle may be removed, making binder a tamper-proof lock. Weighs only 10 lb., exerts 3,000-lb. pull.

I-BEAM TROLLEYS

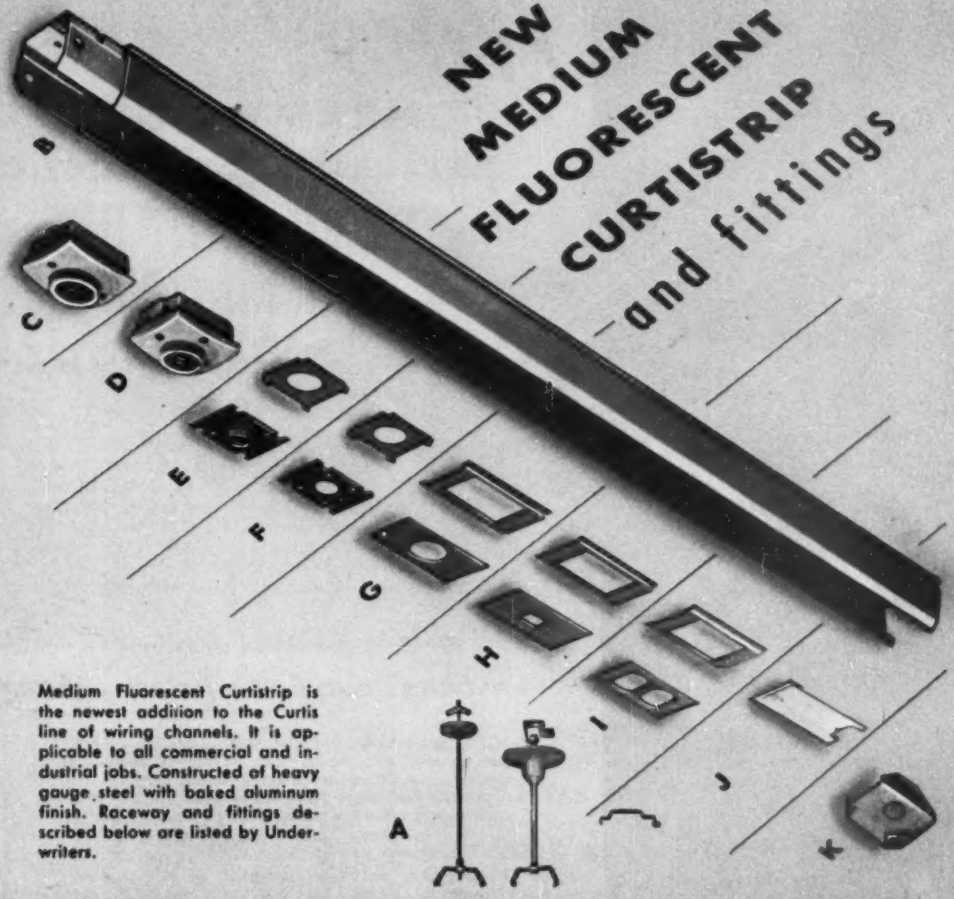
Built for years of satisfactory service. Plain or geared types. Capacities up to 10 tons.

COFFING HOIST COMPANY

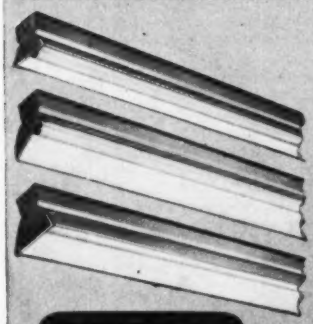
Danville, Illinois

The best of everything electrical . . . via GraybaR

NEW MEDIUM FLUORESCENT CURTISTRIP and fittings



Medium Fluorescent Curtistrip is the newest addition to the Curtis line of wiring channels. It is applicable to all commercial and industrial jobs. Constructed of heavy gauge steel with baked aluminum finish. Raceway and fittings described below are listed by Underwriters.



COMPLETE WIRED UNITS

Medium Fluorescent Curtistrip wired units furnished in 8 ft. sections with 2-lamp ballasts and 4 ft. sections with single lamp ballast. Available with closed or open-end Alzak Aluminum or baked white "Fluracite" enamel reflectors. Shallow Reflector for general lighting, local or indirect lighting. Asymmetric Reflector for sloping surface, show windows or cove lighting applications. Deep Reflectors for semi-concentrating lighting or direct lighting over counters, benches, cases, etc.

FITTINGS

A	Versatile tong and clamp type hangers.
B	Coupling for connecting two pieces of Curtistrip.
C	Porcelain socket with shade holder groove.
D	Porcelain socket, no shade holder groove.
E	Female nipple attachment for supporting reflectors.
F	Plate to connect BX to Curtistrip.
G	Single plate for all standard receptacles.
H	Switch plate for standard toggle switch.
I	Duplex plate for all standard receptacles.
J	Fluorescent lampholder plate.
K	End cap with knockout.

CURTIS LIGHTING, INC.

Write Dept. F-18-05 for free details on this new Medium Curtistrip and the Small and Maged sizes.

Dept. F-18-05 6135 West 64th Street, Chicago 38, Illinois

The best of everything electrical . . . via GraybaR

Now!

HEAVY-DUTY DAY-BRITE CONSTRUCTION PLUS CFI*

*COMFORT FOR INDUSTRY

These scientifically designed *aperatures* make the difference—give the ideal 10% upward component of light.

. . . the first practical answer to industry's need for comfortable lighting

Number one consideration in industrial lighting has always been rugged, durable construction . . . often at the expense of comfortable illumination. But in the past Day-Brite has consistently demonstrated that highest standards of lighting and highest standards of construction can be combined.

Now, after two years of research and study, we're ready to announce *another* great advance in industrial lighting.

To give industry even more comfortable and vision-saving illumination, Day-Brite has completely redesigned its famous Day-Line industrial line. The new CFI Day-Line is *comfort* engineered to give 10% upward light distribution and put an end to the harsh brightness contrasts and dark ceilings that hamper workers.

Now, workers can enjoy freedom from irritation and nervous fatigue due to eyestrain. Now, management can reap the benefits of more production, less work spoilage, higher employee morale and lower accident rate.

All the familiar Day-Brite features are still there, of course—die-formed heavy gauge steel construction, porcelain enameled reflectors, vibration-proof Turret sockets. And yet, CFI Day-Line prices are actually lower . . . actually mean substantial savings on industrial lighting installations.

Get the facts about this newest advance in plant lighting. Day-Brite, Inc., 5417 Bulwer Avenue, St. Louis 7, Missouri. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

253

IT'S EASY TO SEE WHEN IT'S "DECIDEDLY BETTER" DAY-BRITE *Lighting Fixtures*

The best of everything electrical . . . via GraybaR

UTILITY LIFTING JOBS MADE *Quick Easy* with DUFF-NORTON JACKS

CABLE REEL *Jacks*

Duff-Norton Cable Reel Jacks are standard with utility companies for lifting and holding heavy cable reels, because they meet the most exacting demands of utility crews under most adverse field conditions. Weather-proof, non-rocking, they provide rapid, even lifting and lowering.

Specifications				
Jack No.	Capacity Tons	Height Inches	Raise Inches	Weight Pounds
1030-CR	10	30	14	110

Other reel jacks are available with multiple hooks, for handling reels of varying diameters and weights.

POLE PULLING *Jacks*

Duff-Norton Pole Pulling Jacks pull or straighten utility poles without laborious digging. Hinged channel base permits jack operation at an angle or in upright position as required. "Service" need not be interrupted when these jacks are used.

Specifications					
Jack No.	Capacity Tons	Height Inches	Raise Inches	Base Inches	Weight Pounds
529	5	28	18	7x16	91
500	15	37½	23	10x24	250

These Duff-Norton Jacks

SAVE UTILITIES TIME • ENERGY • MONEY

- **TRENCH BRACES**
- **HYDRAULIC JACKS**
- **AUTOMATIC LOWERING JACKS**
- **PUSH AND PULL JACKS**
- **SCREW JACKS**
- **AIR MOTOR POWER JACKS**
- **MANY OTHERS THAT MEET EVERY UTILITY NEED**

DUFF-NORTON JACKS ESTABLISHED 1883

• WRITE FOR CATALOG 203

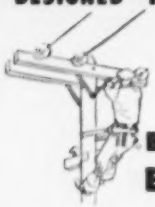
THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO, ONT.

"The House that Jacks Built"

The best of everything electrical . . . via GraybaR

DESIGNED TO MEET YOUR NEEDS IN LINE CONSTRUCTION AND MAINTENANCE



EAGLE

Designed by GUTHRIE

BODIES • TRAILERS • POLE DERRICKS • TOOLS • ACCESSORIES • EQUIPMENT

EAGLE MANUFACTURING CO. DIVISION OF THE FOUR WHEEL DRIVE AUTO CO. **Appleton, Wis.**

UTILITY BODIES—BUILT FOR YEARS OF SERVICE

Steel bodies expressly designed to save time — conserve man power — provide a place for everything. Adaptable to a wide range of uses for large and small utilities — REA's, contractors, telephone, water departments. Sliding top — optional.

Model B6: for mounting on any ½ ton truck chassis with CA dimension of approximately 38 inches. 15 separate compartments — light — compact — attractive.

Model B7: for mounting on any ¾ to 1 ton truck chassis with CA dimension ranging 48 inches to 60 inches. 26 separate compartments. Sturdy — compact — practical.

TRAILERS—IN A WIDE RANGE OF SIZES AND TYPES

ADJUSTABLE LENGTH POLE TRAILER

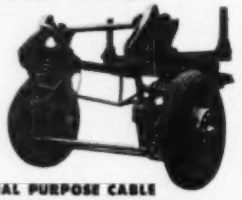
Easily adjusts to accommodate poles up to 90 ft. long — through telescoping center pole. Equipped with electric brakes on rear wheels. Get complete information on Eagle Trailer Model 6450.

FOUR-WHEEL LO-BED TRAILER

Designed for easy loading of heavy bulky units, also suited to pole and general purpose hauling. 5 ton capacity; overall length, including tongue 25 ft. 8 inches. Get complete information on Eagle Trailer Model 6441.

ALL-PURPOSE TRAILER

Combination cargo and pole trailer. Removable fenders and sideboards; front and rear bolsters with sliding uprights; king pole binder; load binder winch and 10 ft. extension tongue. 2 to 5 ton capacity. Get complete information on Eagle P 8 T Series Trailers.



DUAL PURPOSE CABLE REEL AND POLE TRAILER

Can be used as a cable reel trailer handling reels from 34 inches to 38 inches or from 44 inches to 48 inches width; or as a pole trailer by removing saddles and installing bolsters. Get complete information on Eagle Trailer PCP W-PCP Series.

LIGHT DUTY CARGO AND GENERAL PURPOSE TRAILER

Light duty, 1 ton capacity, trailer for hauling one or two poles, cross-arms, pole hardware, etc. Has pole saddles front and rear and removable end boards. Get complete information on Eagle Trailer Model 7163.

DERRICKS

TRIPOD TYPE

available in either steel or aluminum construction for mounting on truck chassis.

T-TYPE

designed for use with a double drum winch.

Get complete information on Eagle Pole Derricks Types M-40, M-45, M-2870, T-45

SURE BINDER

The handiest time-saving tool ever developed for binding logs, poles, and bulky loads to trailer or truck. Get complete information on the Eagle Sure Binder.

HEAVY-DUTY DRAWBAR

For heavy duty use with pole trailers of 3 to 5 tons capacity. Equipped with coupling eyes to fit standard pintle or towing hook. Get complete information on Eagle Heavy Duty Drawbar H.

COLLAPSIBLE REEL

Reels up wire quickly and neatly. Attaches to winch shaft. Easy removal of coiled wire by collapsing holding arms of reel. Weight only 75 lbs; made of aluminum alloy and steel. Get complete information on Type CR Collapsible Reel.

SEND FOR COMPLETE CATALOG

Items shown are only a part of the wide range of line construction and maintenance equipment, tools, accessories built by Eagle. Send today for the complete catalog — a useful reference book.

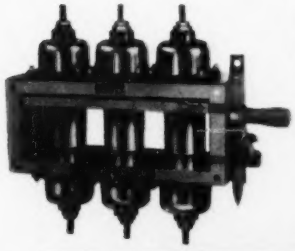
The best of everything electrical . . . via GraybaR

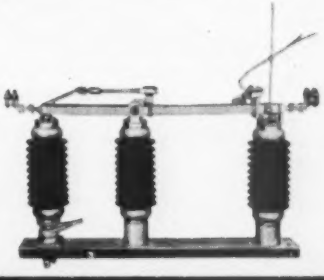
THREE E

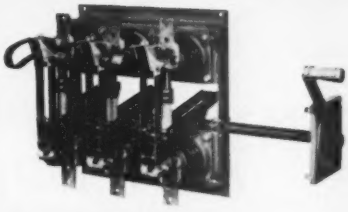
High Voltage Switchgear and Accessories

True efficiency in high voltage switchgear means packing a lot of reliability and convenience in compact, economical form.

These Three E products *are dependable* . . . each is solidly made of the best materials . . . each is backed by forty years of experience in high voltage engineering and manufacturing. Careful design has made them as compact and economical as a wide safety margin and their heavy duties will allow. Your assurance of Three E reliability is the thousands of units now at work wherever real *efficiency* is a must.







Detailed bulletins are available for any of these THREE E products

ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

The best of everything electrical . . . via GraybaR

EVERSTICK ANCHORS

FOR TOUGH ANCHORING JOBS!

Today's anchoring jobs bring Eversticks to the forefront. They provide tight, safe anchoring . . . always in excess of rated capacities. Easy and quick to install . . . made of finest grade malleable iron with superior rust-resisting qualities and exceptional toughness. Every Everstick is plainly marked for ease of handling and storing.

The nut housing feature of the Everstick prevents rod from slipping thru while installing and provides a solid substantial base for the expanding blades.

There's a complete line of Eversticks for all strain requirements. 15 sizes of 2-way—3-way—4-way types.

EVERSTICK ANCHOR CO., Fairfield, Iowa

The best of everything electrical . . . via GraybaR

MUTUAL ENDORSEMENT

IN PROCUREMENT... Two fundamentals apply, always. 1. Pick yourself a reliable source of supply. 2. Specify a definite manufacturer's product, for quality's sake...This page displays two names to which you can pin your faith, under all circumstances. Everything you need is there—modern-specification insulation; quality-guaranteed construction; intelligent, cooperative service.

- BARE WIRES AND CABLES
- OK*—PEERLESS*—TIP-TOP* WEATHERPROOF WIRES
- GUARDIAN* BUILDING WIRES AND CABLES—THERMOPLASTIC AND RUBBER INSULATED
- ROMEX*, ROMEX-G AND ROMEX-N NON-METALLIC SHEATHED CABLES
- VARNISHED CAMBRIC POWER AND CONTROL CABLES, THERMOPLASTIC AND THERMOSETTING JACKETED, BRAIDED, OR LEAD SHEATHED
- SUPER SERVICE AND OTHER PORTABLE CORDS AND CABLES
- SERVICE CABLES—ALL TYPES

"More Power to You"

*TRADE MARK REG. U.S. PAT. OFF.

GENERAL CABLE
CORPORATION

OFFICES IN PRINCIPAL CITIES

The best of everything electrical... via Graybar

MADE FOR USE TOGETHER, G-E control and Tri-Clad motors give reliable service in every industrial application.

G-E Motors and Control Give Longer Service, Need Less Upkeep

Used together, G-E motors and control reduce expenses, guard against production breaks.

In every G-E Tri-Clad* motor, for example, you get *built-in* extra protection against electrical breakdown: one-piece cast-aluminum rotor, Formex* wire windings, double-end ventilation.

Rigid, cast-iron structure resists heavy blows, dripping liquids, corrosive fumes. And you can relubricate a Tri-Clad motor when the application requires it—without halting production!

Big new features in G-E motor starters give extra long life and cut maintenance costs too. Plastic block keeps windings permanently protected. Fine silver tips outlast ordinary contacts, stand up on toughest "start-stop" jobs.

Moving structure is rugged and simple. No metal-to-metal friction between magnet and coil. Reliable overload relays need little attention. Heaters are up front—easily changed without disturbing wiring.

Call or write today for more information.

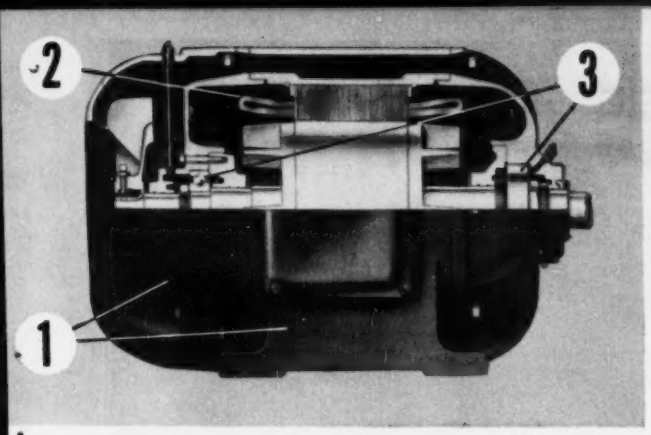
PROMPT DELIVERY! Many models of G-E control and Tri-Clad motors are available from stock. Especially important now, you get quick, efficient service too!

GENERAL ELECTRIC

6-4-106

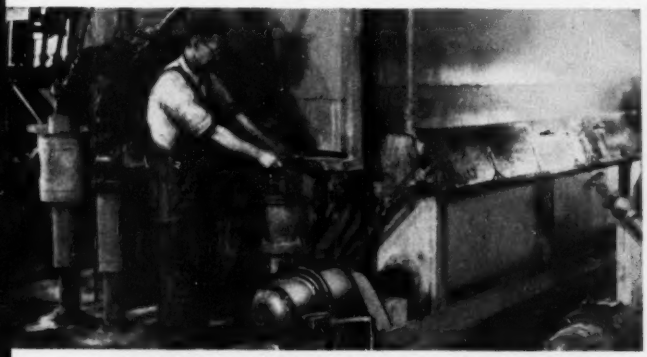
*Registered trade-marks of General Electric Co.

The best of everything electrical . . . via GraybaR

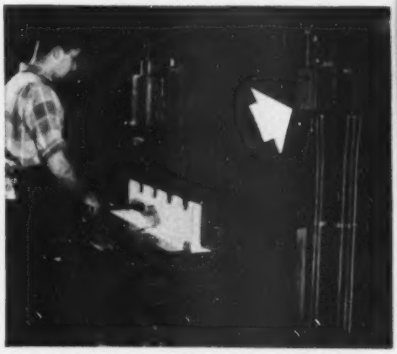


LONGER LIFE is assured by (1) rigid, cast-iron end shields and frame; (2) Formex wire windings; (3) completely enclosed bearings with provision for relubrication without disassembly.

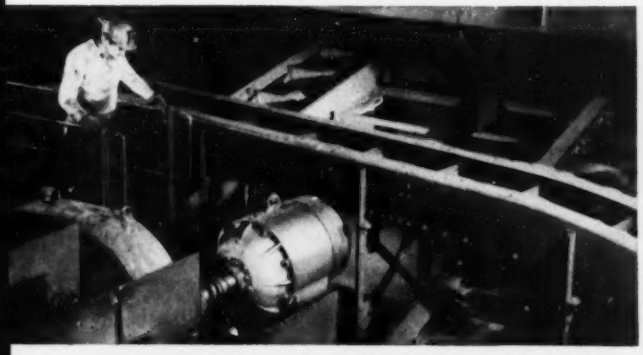
ACCESSIBLE TERMINALS make electrical connections fast, easy. Panhead screws and saddle-type connectors give rigid connections.



NO COSTLY SHUTDOWNS on this food-plant "continuous process" operation! Totally enclosed, non-ventilated, Tri-Clad gear-motor provides reliable drive for this repulper in large sugar refinery.



PRODUCTION PROTECTION is afforded by G-E motor starter on this mortiser by helping prevent time-consuming, costly shutdowns.



CORROSION-RESISTANT Tri-Clad motors can take abuse, won't twist out of line. Totally enclosed, fan-cooled, Tri-Clad motor above has given long, continuous service on a coal conveyor.

CONSTANT USE in stop-and-go operations on this 15-hp rip saw proves ruggedness of the sturdy, G-E magnetic motor starter.

The best of everything electrical . . . via GraybaR

You should expect the best value from G-E fluorescent lamps

WATER TOO PURE TO DRINK HELPS GIVE YOUR CUSTOMERS MORE LIGHT. It's the water on the *right* you wouldn't want to drink. It's so pure it's tasteless. You'd prefer the water on the left. Ordinary tap water, it's safe enough for drinking. But not for G-E fluorescent lamps. A chemical reagent shows mineral impurities. If they got into the phosphor coating, they would cut light output. On the glass tube, they would create a streaked look. So General Electric uses the specially ultra-deionized water shown at right in making our phosphors and to wash our lamp tubes. It's twice as free of minerals as distilled water. A small precaution — perhaps. But it helps give your customers more light and better looking lamps. It's another reason why you and your customers *should* expect the best value from G-E fluorescent lamps.

You can put your confidence in

GENERAL ELECTRIC

The best of everything electrical . . . via GraybaR

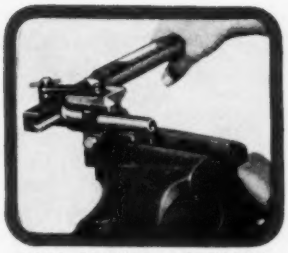
Speed, simplify

electrical construction jobs...cut costs...

with GREENLEE timesaving tools for electrical work

GREENLEE HYDRAULIC CONDUIT BENDER

Conduit installations go far faster . . . neat, tailor-made jobs result every time with a GREENLEE Bender. Many owners report labor savings from 50% to 90%... and the cost of many manufactured bends and fittings is eliminated. For, with the GREENLEE *one man* in but minutes makes smooth, accurate bends in pipe up to 5", rigid and thin-wall conduit, tubing and bus bars. Compact and portable, the GREENLEE Hydraulic Bender can be easily and quickly moved for *on-the-job bending* exactly where and when wanted! Users say it often pays for itself on the very first job. Get facts today.



HAND BENDERS FOR TUBING
For quickly making small-radius bends, up to 180°, without flattening or kinks. Saves up to 75% in time and materials on many jobs. Various models and sizes to fit your work.

KNOCKOUT PUNCHES AND CUTTERS
Here's the quick, easy way to make knockout enlargements for ½" to 4" conduit. Simply insert GREENLEE Knockout Punch in knockout or small drilled hole, then turn with an ordinary wrench.

GREENLEE KNOCKOUT PUNCH DRIVER
This powerful portable hydraulic tool drives GREENLEE Knockout Punches through 10-gauge metal in a jiffy. Drives all sizes of GREENLEE punches to make openings for ½" to 4" conduit.

SEE YOUR ELECTRICAL DISTRIBUTOR...

. . . get complete information on the above and other GREENLEE timesaving tools: Hydraulic Pipe Pushers • Cable Pullers • Joist Borers • Electricians' Auger Bits • Bell Hangers' Drills • Bit Extensions • Expansive Bits • Spiral Screw Drivers • Automatic Push Drills • and many more. Greenlee Tool Co., 1806 Columbia Avenue, Rockford, Illinois.

The best of everything electrical . . . via GraybaR

HUBBARD 4-WAY
WOOD STRAIN INSULATORS
for
maximum strength

Large arrows indicate direction of pull. Small arrows show the direction of resultant forces on wood member when strain is applied. Pressure is inward on all sides of the wood.

WHEN TENSION is applied to the Hubbard Wood Strain Insulator, the interlocking plates move forward simultaneously, and the inclined planes under the heads and nuts of the assembly bolts move uniformly inward, exerting a pressure in a direction 90-degrees to the line of pull on all four sides of the wood member. The design takes advantage of a higher percentage of the fibre strength of the wood than any other type of wood strain insulator.

The end plates almost completely enclose the wood, preventing end-checking over long periods of service. The wood member and the mechanical attachments of the fittings to the wood are the strongest parts of the strain insulator. When pulled to destruction, failure occurs at the clevis end of the attachment strap. This is desirable, as the strength of these straps is fairly constant and can be predetermined, whereas wood, and attachments to wood are variable as to strength properties, especially over long periods of exposure.

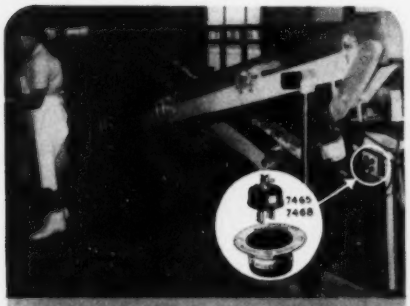
H HUBBARD AND COMPANY
ESTABLISHED 1845
PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA
"Hang the Load on Hubbard Hardware!"

The best of everything electrical . . . via GraybaR

modernize...

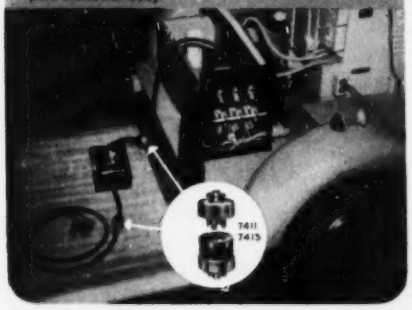
with HUBBELL *Twist-Lock* DEVICES

Twist-Lock devices eliminate time losses and annoying delays because they "Stay Put"... are vibration proof... assure a lockfast electrical connection under all conditions.



1. Midget Twist-Lock devices numbers 7465-7468 used with Potato Chip Packing Machines, Cadie-Kay Company.

2. Power take off from portable generator set, demonstration unit of Contour Saws, Incorporated, illustrating 20 Ampere Cap, #7411 cap used with #7413, 20 Ampere connector body



Twist-Lock devices are engineered and designed to meet a wide variety of conditions and requirements in industrial use.

- STRONGER
- LONGER LIFE

"A TWIST OF THE CAP AND IT LOCKS"

AS EASY AS

1-2-3

1. Plug in 2. Twist 3. They're locked

Twist-Locks are manufactured in complete lines of two, three, and four wire electrical locking devices, in ratings from 10 Amperes to 50 Amperes.

They never disconnect accidentally!

HARVEY HUBBELL, Inc.

BRIDGEPORT, CONN.

HUBBELL
THE ORIGINATOR OF
THE LOCKING WIRING DEVICE*

*For best results specify Hubbell Twist-Lock, a complete line of LOCKING WIRING DEVICES.

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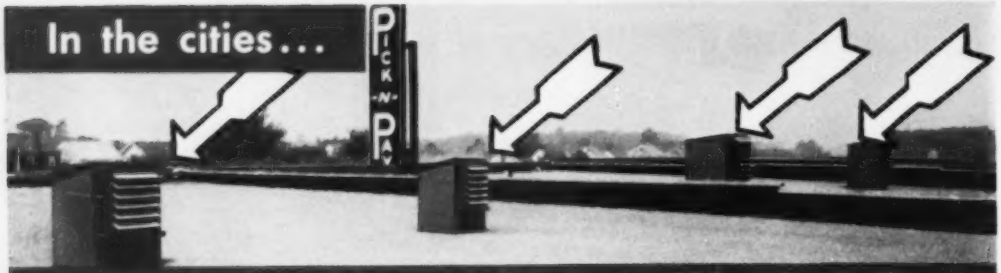
In the cities...



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EVERYWHERE, IT'S

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VENTILATION

You can recommend ILG Ventilating Equipment for every air-moving use with full confidence that it will deliver complete satisfaction. Made to highest quality standards with certified capacity ratings, established decibel ratings, and a "One-Name-Plate" Guarantee covering both fan and motor. Use our world-wide experience to get answers to any ventilating problem—just call our nearby Branch Office (consult classified directory) or write us.

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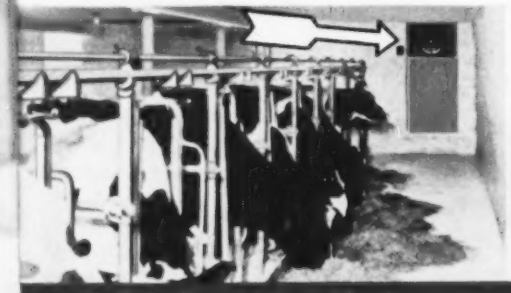
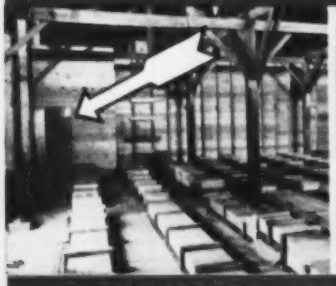
2885 N. Crawford Ave., Chicago 41, Illinois
Offices in more than 50 Principal Cities



Ventilating barns, poultry and hog houses

...on the farms

Drying corn, on the ear or shelled



Drying hay in the mow

Reducing potato storage spoilage

Drying grain in the bin

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"We can't keep up with them since they got those new THOR SCREWDRIVERS"

Thor TOOLS

Thor Portable Electric Screwdrivers and Nut Setters have speeded up production on thousands of assembly line jobs ever since Thor invented the *first* power screwdriver. For a demonstration of Thor power . . . precise *adjustment* . . . *handling* ease in your plant, call in Thor assembly tool experience — or write for free catalog.

Independent Pneumatic Tool Co., Aurora, Ill.

DRILLS • IMPACT WRENCHES • SCREWDRIVERS • TAPPERS
NUT SETTERS • GRINDERS • SANDERS • BENCH GRINDERS
POLISHERS • SAWS • HAMMERS • NIBBLERS
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DEPENDABLE *Poles* of

Selected Sound Timber Scientifically Treated

THE lasting strength of International Creosoted Pine Poles plus their low ultimate cost makes them the safest and most economical poles that can be purchased. For more than 75 years, numerous service records of pole treatments have been utilized to perfect the present production practices for International Creosoted Poles. As a result of the lessons learned during this long experience, International Creosoted Poles will assure trouble-free, continuous service. Their straight, clean, smooth surfaces perfectly adapt them for street lighting, rural and urban distribution.

International Creosoted Pine Poles are manufactured and distributed by two of the oldest companies serving the utility industry. They have grown up together, ready always to serve with quality poles, framed correctly, and shipped when needed.

Distributed by GraybaR

INTERNATIONAL CREOSOTING & CONSTRUCTION CO.

PRODUCERS OF HIGH GRADE TREATED TIES, POLES, PILES, ETC.

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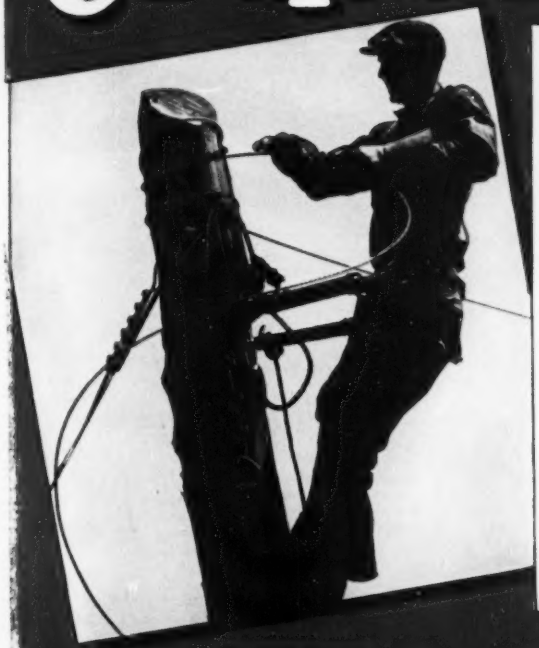
Crapo Steel Strand



For Guys, Messenger and Overhead Ground Wire, Specify Crapo Strand!

Strength, ruggedness, workability, long-life are combined — with all-important **economy** — in Crapo Galvanized Steel Strand.

The superior tensile strength of the steel is utilized to fullest advantage in each size and grade. The heavy, ductile, tightly-adherent galvanized zinc coating — applied by the famous Crapo Process — provides dependable protection for the steel, prolongs the life of the strand.

There is a size and grade of Crapo Galvanized Strand for every practical need. Contact the nearest Graybar house or ask the Graybar representative for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

PREFORMED ARMOR RODS

Protect and Reinforce Your Conductors at Small Cost

PREFORMED ARMOR RODS provide a **simple, practical, economical** method of reinforcing and protecting overhead conductors and static wires at the point of, and in the region of, the supports.

Accurately designed and preformed to prescribed length and pitch, these spiral rods form a snug-fitting, compact, cylindrical armor over conductor or static wire. Easily and quickly installed by hand or they can be applied with special "hot-line" tools. **No clamps or clips** required.

PREFORMED ARMOR RODS also are being used successfully to repair multi-stranded conductors and to reinforce worn conductors. Produced in Galvanized and Stainless Steel, Aluminum, Copperweld and Copper or Bronze. Ask your Graybar representative for details!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

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JEFFERSON PRODUCTS

GEARED TO TODAY'S EXACTING REQUIREMENTS

BALLASTS for Fluorescent Lamps

CERTIFIED ETL — Meets All Requirements of the Proposed American Standard Association Test Specification C82.1

430 MA—118V, 60 Cycle Series Sequence Ballast

The improved new Jefferson Ballast for series sequence operation of 96T12 lamps is compact, quiet, and only 12½ lbs. in weight. Its quality precision construction assures longer life, improved lamp life and all round fixture performance.

QUICK STARTING

Jefferson assures positive starts even at voltages as low as 106 volts.

COOL and HEALTHY

Operation at low temperature with low watt loss means longer healthy life.

NO HUM

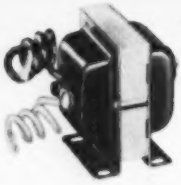
Advanced engineering and traditional Jefferson quality eliminate audible hum.

DELIVER FULL RATED WATTAGE

Both lamps get full wattage (wattage loss only 29 watts), sustain lamp brilliance.

This Very Latest Model JEFFERSON Wizard Bell Transformer

Replaces 3 Models For Door Bells, Buzzers, Door Openers and Annunciators



10-V Secondary 5-Watts Universal Mounting

Fills More Needs with Less Stock to Carry

The one Jefferson Universal-Mounting WIZARD Bell Transformer for operation of door bells, buzzers, annunciators and door openers replaces THREE models. It is designed with lip and set-screw for clamping to edge of the knock-out of the metal cover, box or cabinet with primary leads for connecting to circuit and terminals for bell wires. Mounting feet are also provided for open wiring installations. No separate plates are required. Ideal for close-quarter installations. Stocked by Electrical Wholesalers Everywhere.

Approved by Underwriters' Laboratories, Inc.

FUSES FOR BETTER PROTECTION

- THERMAL, — SAF-T-LAG DUAL ELEMENT
- RENEWABLE, — SUPER-LAG
- RENEWABLE, — JEFFERSON-UNION
- NON-RENEWABLE
- FUSTATS • PLUG FUSES

Select the type for your particular needs

The Jefferson SAF-T-LAG is a heavy-duty Thermal Non-Renewable Fuse with an extra *Safe-Time-Lag* to protect equipment and machinery,—it acts positively on dangerous overloads yet prevents premature and unnecessary blowing on harmless, temporary overloads. The copper elements used have much lower resistance than conventional zinc elements providing 50% lower watt loss and cooler operation.

Jefferson SUPER-LAG *Renewable Fuses* with the long time lag for motor loads and UNION Renewable Fuses for circuits where surges are not pronounced. A minimum number of parts permits quick and easy removal.

Where overloads are not a frequent occurrence, as for lighting circuits, the Jefferson *Non-Renewable Fuse* is the choice for economical, dependable service.

The Jefferson Fustat prevents tampering or over-fusing. It has a built-in *thermal cutout* which provides a *long time lag*. Made in capacities of .3 to 30 amperes, for 115-volt circuits.

Plug Fuses, well-made of strong molded insulation, — 3 to 30 amperes, for 115-volt circuits.

JEFFERSON ELECTRIC COMPANY • Bellwood, Illinois

In Canada: *Canadian Jefferson Electric Co., Ltd., 384 Pape Ave., Toronto, Ont.*

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It Pays to have the Right Equipment

OSHKOSH

POLE LINE TOOLS

LEACH COMPANY • OSHKOSH, WISCONSIN

Write for full line catalog

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MERCOID

The choice of top engineers

Mercoid Controls have a wide range of industrial applications where it is necessary to electrically stop and start motors involving the control of Pressure, Temperature, Liquid Level and Mechanical Movement.

Graybar's extended distributing centers offer a convenience for prompt service to engineers requiring any Mercoid standard control.

For complete information on the entire line write for Catalog No. 700A.

THE MERCOID CORPORATION • 4201 BELMONT AVE., CHICAGO 41, ILL.

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A BETTER FIXTURE FOR EVERY LIGHTING NEED... from

Leader

Quality Fixtures for

THE OFFICER

America's finest fluorescent fixture for interiors of distinction. Streamlined and gracefully proportioned. Translucent plastic side panels, one-piece injection moulded plastic louver with choice of 31° or 45° shielding. For two, three or four 40-watt lamps, or Slimline lamps in lengths from 48" to 96".

THE STRATOLINER

This heavy-duty, all-steel unit offers everything desired in an industrial fixture. Durable, strongly built, neat in appearance, easily serviced. Reflector finished in baked enamel or porcelain enamel (RLM approved). Available in open or closed end style for two or three 40-watt lamps, or two 85-watt lamps.

RECESSED TROFFERLITE

Leader troffer fixtures offer versatility of lighting design and high light values. Shown here with matching incandescent spotlight. Trofferlites are available with a wide variety of glass or specialized lenses, also in louvered, baffled and open styles. Complete range of lengths, choice of regular or shallow depth, 12" or 24" width, for from two to eight lamps.

Sold and installed by the better electrical dealers and contractors

Leader America's No. 1 Lighting Equipment Manufacturer

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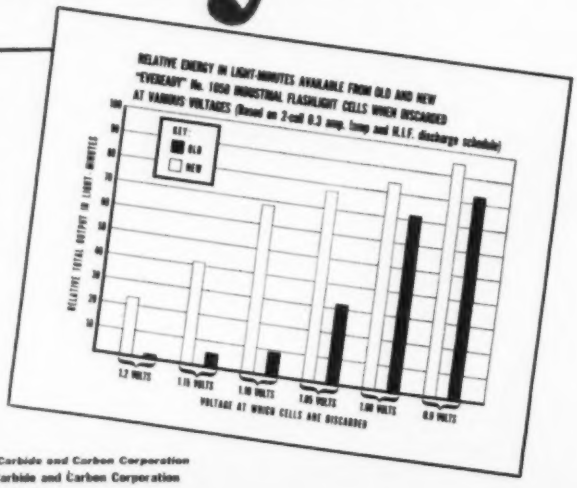
It's the NEW "Eveready" No. 1050 Flashlight Battery!

More than DOUBLE the Usable Light!

HERE IS A FLASHLIGHT BATTERY OF COMPLETELY NEW AND DIFFERENT DESIGN. A battery so potent that it delivers more than twice as much usable, brilliant white light for critical uses as any other flashlight battery National Carbon has ever made. In addition, it also provides more light-energy output to the lower cut-off points. It is the new and improved "Eveready" No. 1050 flashlight battery.

This battery has no "metal can" to leak or corrode. It will not swell, stick or jam in the flashlight. Try these new batteries in your industrial and safety flashlights. Compare them with the batteries you have been using. See for yourself how much better they are...how much more economical to use.



The term "Eveready" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY • A Division of Union Carbide and Carbon Corporation

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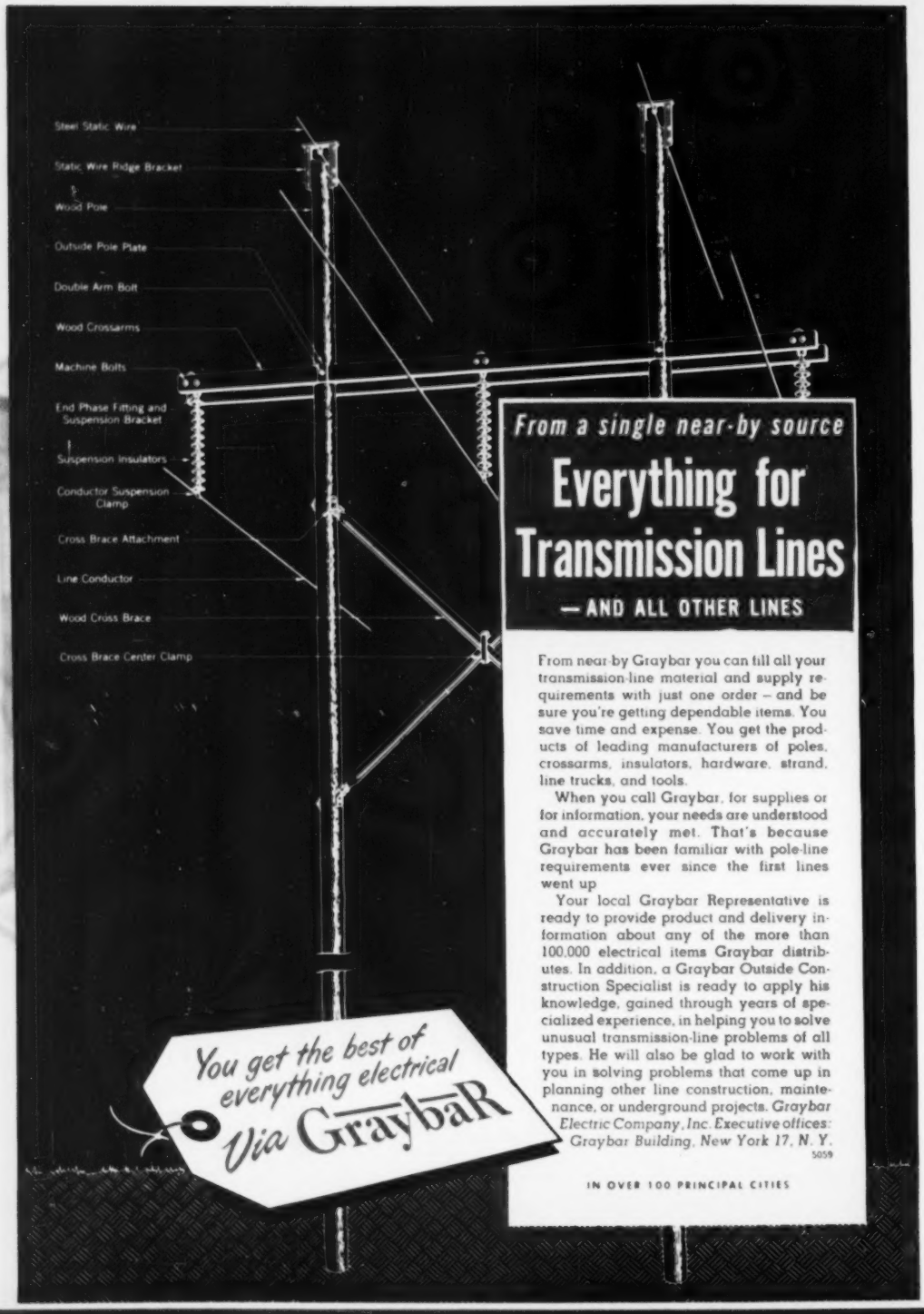

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Everything for Transmission Lines

— AND ALL OTHER LINES

From near-by Graybar you can fill all your transmission-line material and supply requirements with just one order – and be sure you're getting dependable items. You save time and expense. You get the products of leading manufacturers of poles, crossarms, insulators, hardware, strand, line trucks, and tools.

When you call Graybar, for supplies or for information, your needs are understood and accurately met. That's because Graybar has been familiar with pole-line requirements ever since the first lines went up

Your local Graybar Representative is ready to provide product and delivery information about any of the more than 100,000 electrical items Graybar distributes. In addition, a Graybar Outside Construction Specialist is ready to apply his knowledge, gained through years of specialized experience, in helping you to solve unusual transmission-line problems of all types. He will also be glad to work with you in solving problems that come up in planning other line construction, maintenance, or underground projects. *Graybar Electric Company, Inc. Executive offices: Graybar Building, New York 17, N. Y.*

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1

2

3

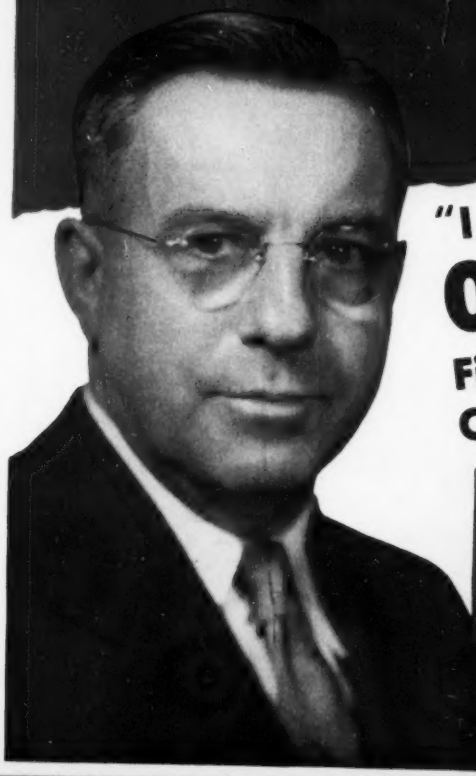
4

5

6

ORANGEBURG Standard
installed with
concrete encasement

ORANGEBURG Nocrete
installed without
concrete encasement



"I always specify
ORANGEBURG
Fibre Conduit for Complete
Cable Protection"
says the Utility Engineer

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Coupling Conduit?

it's easy...

with an O.Z. Split Coupling

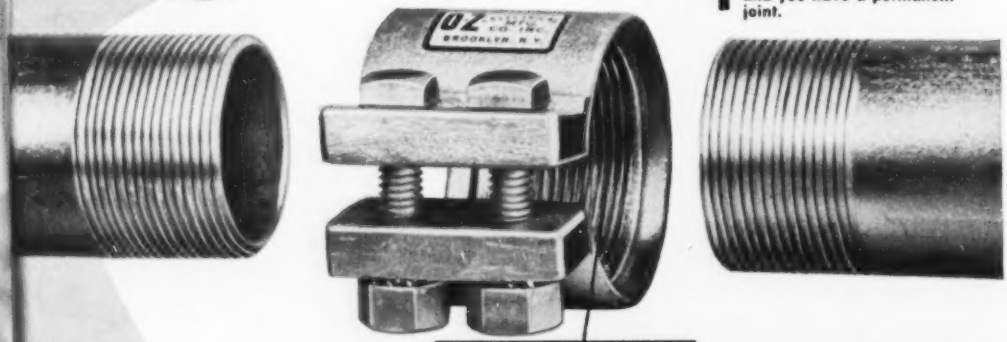
THESE YOUR PROBLEMS?

Not enough space
No room for wrench
Hard to get at
Conduits can't be turned

HERE'S YOUR ANSWER!

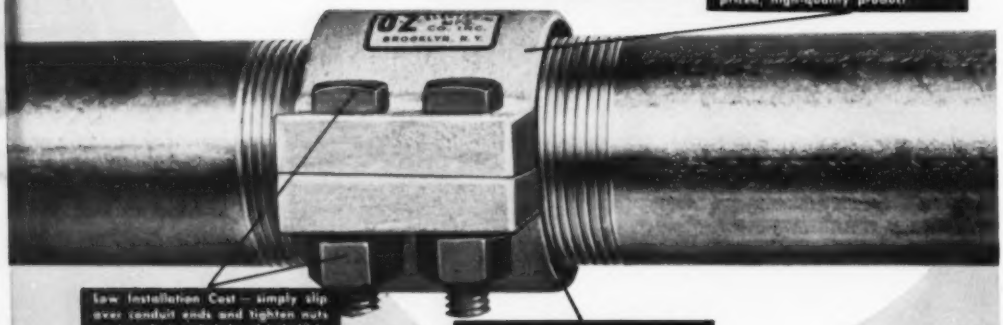
O. Z. is the simple, dependable way to couple conduit. Just butt the conduit ends within the opened O. Z. Split Coupling, tighten two nuts and you have a permanent joint.

UL Approved



Interior Threading — meshes with conduit threading for a rigid close-fitting connection.

Low Price — simple, one-piece malleable iron construction assures low-priced, high-quality product.



Low Installation Cost — simply slip over conduit ends and tighten nuts to close fitting. Bolt head is held in place by coupling shoulder.

Available for conduit sizes ranging from ½" to 5"

8192

O.Z. ELECTRICAL MANUFACTURING COMPANY, INC.
162 BOND STREET BROOKLYN 2, N. Y.

Your local O. Z. distributor is ready *now* to serve you from stock. Get in touch with him for further information on the complete, dependable O. Z. line of electrical fittings.

CONDUIT FITTINGS • CABLE TERMINATORS • GROUNDING DEVICES
CAST IRON BOXES • SOLDERLESS CONNECTORS • POWER CONNECTORS

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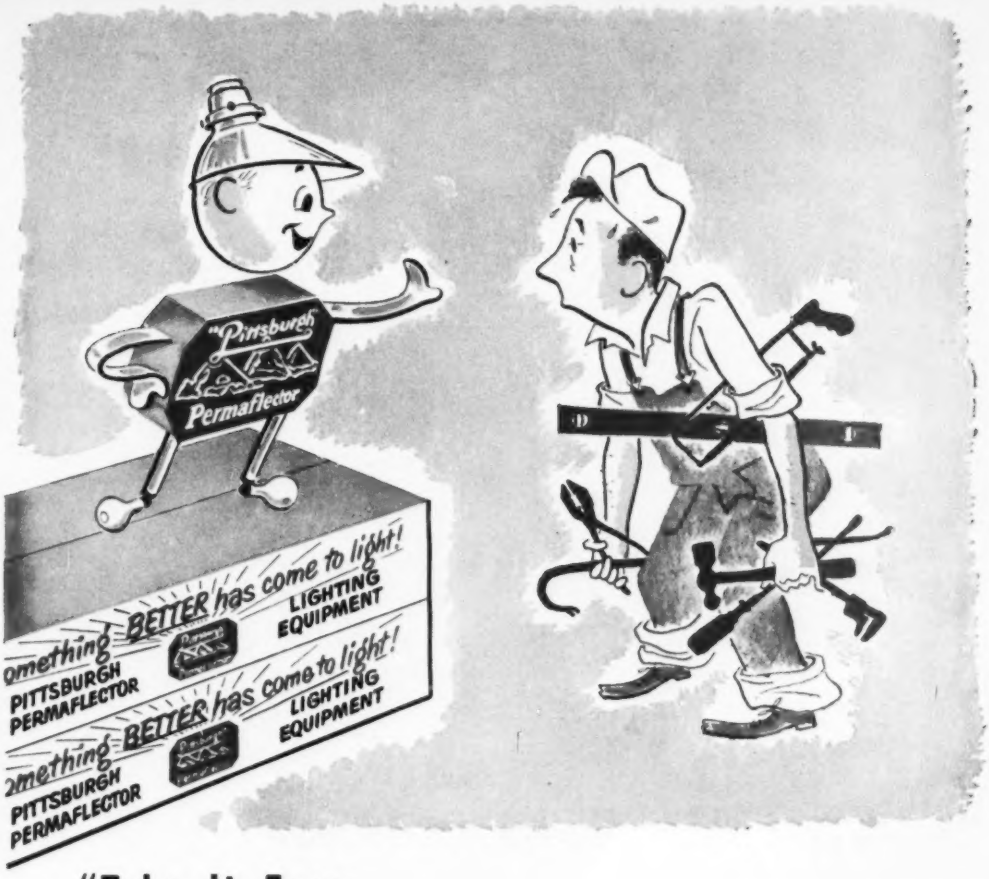


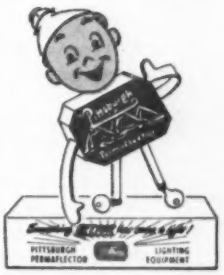
"Take it Easy... the Job's Half Done!"

The job's half done when you install Pittsburgh Permaflector Lighting Equipment. All Fluorescent Units come compactly wired and ready-to-install. They go up quickly and easily. They save many man hours of installation time.

In end-to-end mounting, Pittsburgh Permaflector Fluorescent Units lock together and align perfectly. Squares and other patterns are a "natural" to install.

Next time—take it easy. Use time-saving, labor-saving Pittsburgh Permaflector Lighting Equipment.

PERMAFLECTOR PETE SAYS:



"Pittsburgh Lighting + Saved Manhours = MORE" PROFIT

Write today for full profit advantages of working with flexible Pittsburgh Permaflector Lighting Equipment.

"Pittsburgh" Permaflector

Pittsburgh Reflector Company

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Permaflector Lighting Engineers in All Principal Cities

DISTRIBUTED BY ELECTRICAL WHOLESALERS EVERYWHERE • PERMAFLECTOR LIGHTING ENGINEERS IN ALL PRINCIPAL CITIES

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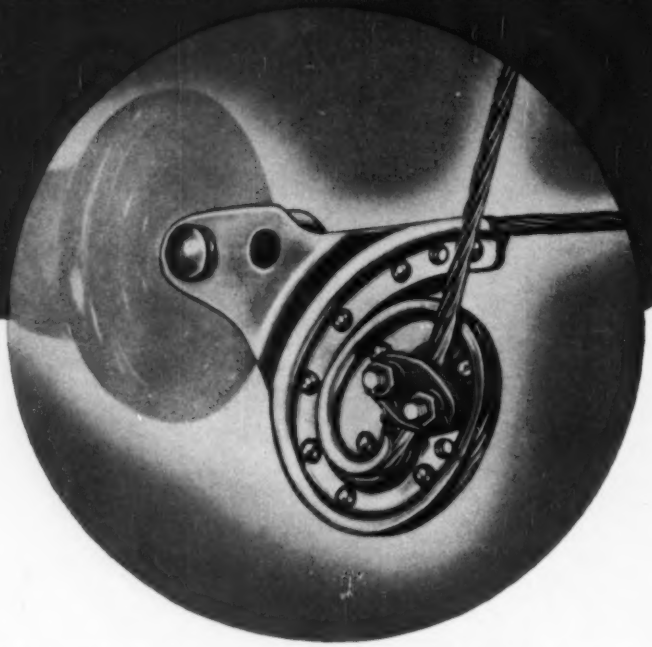
Reliable SNUB DEADEND

Easy on CONDUCTORS

Easy to INSTALL



The Reliable No. 420 Snub Deadend is made of high strength, non-corrosive aluminum alloy, is low in cost and accommodates No. 2 or No. 4 A.C.S.R. It has been approved for use on A.C.S.R. without armor tape.

The spiral form of this deadend for A.C.S.R. carries the snub principle to full advantage. This clamp develops approximately the full strength of the conductor and distributes the strain equally on all strands.

It is easy to install. A hole has been provided for attaching a sling which holds the deadend in proper position while the conductor is being attached. The 2-bolt bridge clamps and holds the A.C.S.R., both the aluminum and the steel, after more than a full one and one-half turns of snub. The No. 420 develops the full strength of the wire. Weighing about three-quarters of a pound, this clamp minimizes vibration fatigue strains, prolonging the life of the conductor.

Reliable ELECTRIC COMPANY

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POWER-LINE CONNECTORS and CONSTRUCTION SPECIALTIES

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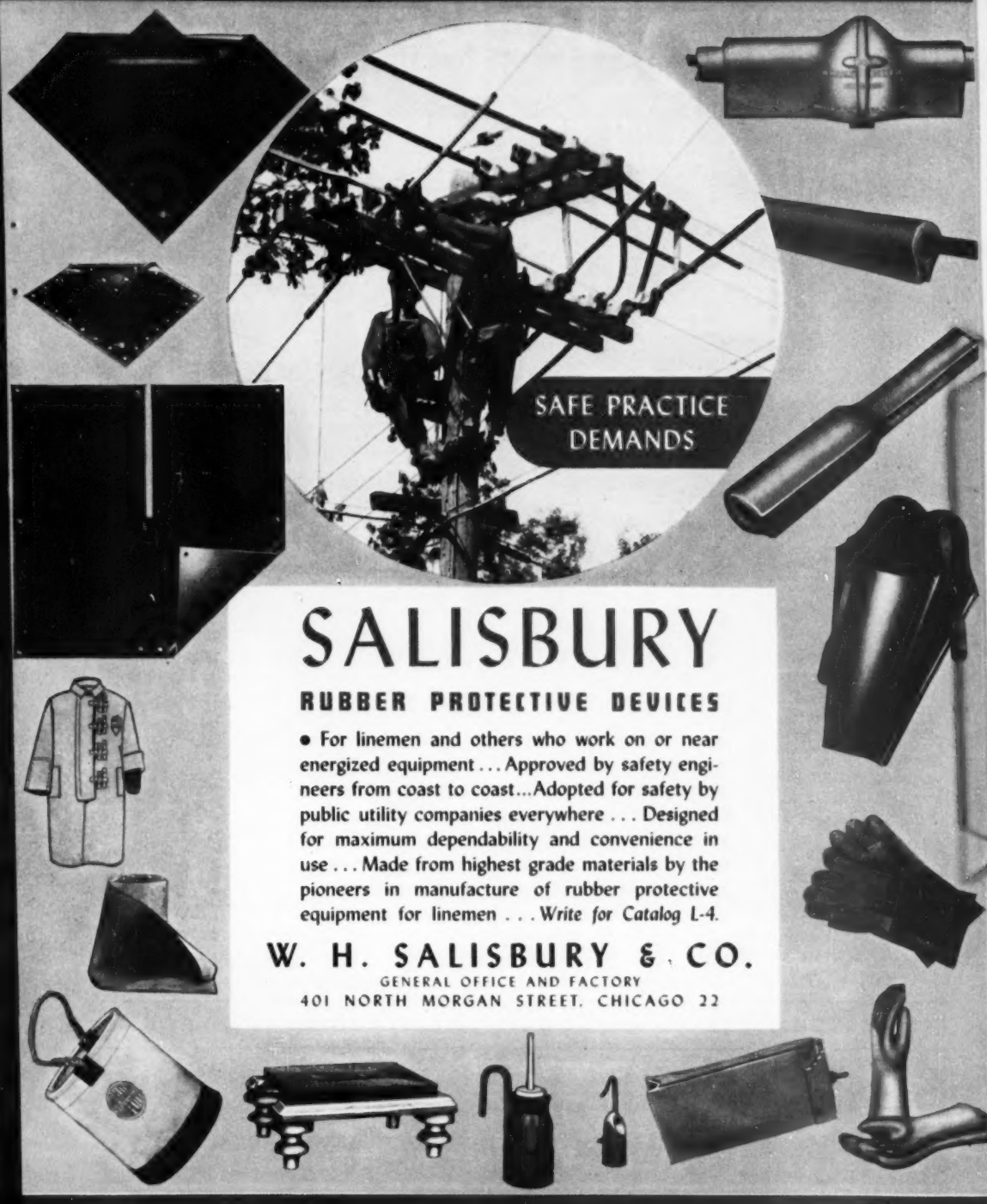
A DEVICE FOR EVERY ELECTRICAL HAZARD



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RUBBER PROTECTIVE DEVICES

• For linemen and others who work on or near energized equipment . . . Approved by safety engineers from coast to coast . . . Adopted for safety by public utility companies everywhere . . . Designed for maximum dependability and convenience in use . . . Made from highest grade materials by the pioneers in manufacture of rubber protective equipment for linemen . . . *Write for Catalog L-4.*

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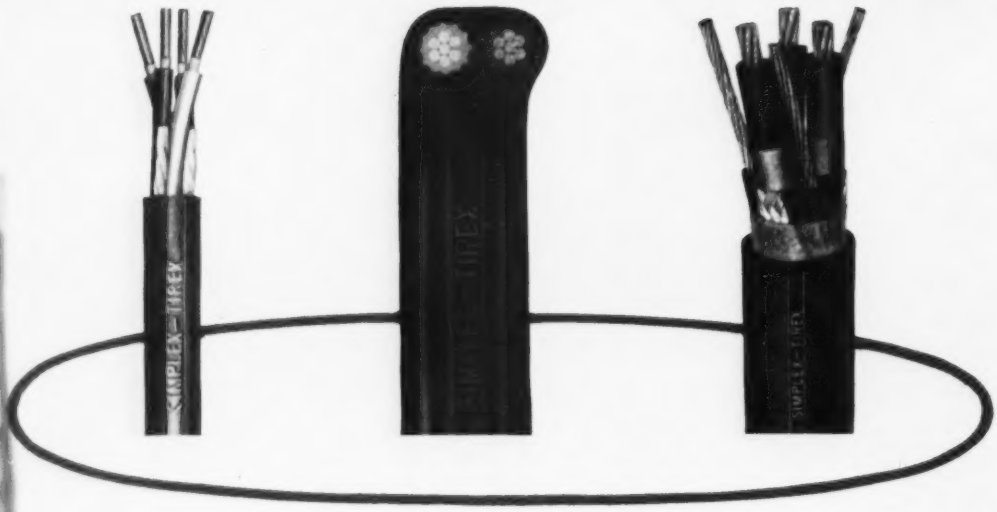
GENERAL OFFICE AND FACTORY
401 NORTH MORGAN STREET, CHICAGO 22

The best of everything electrical . . . via GraybaR

TIREX IS A FAMILY



To a great many people the name "TIREX" means a small, flexible, long-wearing portable cord. Actually, TIREX is the name of a family of portable cords and cables. The family ranges in size from a single conductor #18 cord, all the way up to a 3-conductor Type SH-D cable for voltages in excess of 10,000 V.W.P.

TIREX cords are made in sizes from 18 to 10, from single to eight conductors in Type SO, and from two to four conductors in Type SJO. There are TIREX Mine Cords, as well as heavy duty shielded cords.

In the cable field there are single and multi-conductor cables, shielded or unshielded, Types W or G, SH-A, SH-B, SH-C and SH-D.

Your local Graybar branch has many of the TIREX cords and some of the TIREX cables in stock. They can get most of the other stock type TIREX cords and cables for you in a comparatively short time. Be sure you see your local Graybar branch whenever you need portable cords and cables.

SIMPLEX-TIREX IS A PRODUCT OF SIMPLEX RESEARCH

SIMPLEX-TIREX

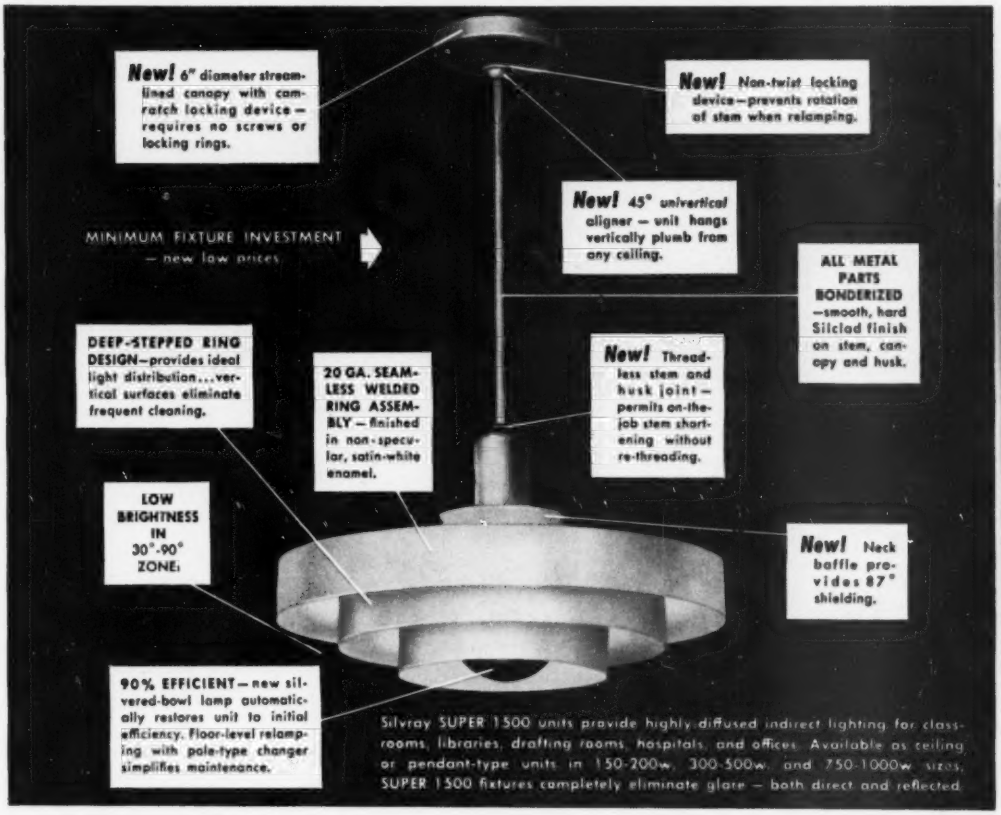
SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39 MASS

The best of everything electrical . . . via Graybar

COMPARE!

No other indirect, incandescent fixture offers ALL these features . . .

SILVRAY'S improved SUPER 1500 UNIT


New! 6" diameter streamlined canopy with cam-ratch locking device — requires no screws or locking rings.
New! Non-twist locking device—prevents rotation of stem when relamping.
New! 45° univertical aligner — unit hangs vertically plumb from any ceiling.
MINIMUM FIXTURE INVESTMENT — new low prices
ALL METAL PARTS BONDERIZED —smooth, hard Silclad finish on stem, canopy and husk.
DEEP-STEPPED RING DESIGN—provides ideal light distribution...vertical surfaces eliminate frequent cleaning.
20 GA. SEAMLESS WELDED RING ASSEMBLY — finished in non-specular, satin-white enamel.
New! Threadless stem and husk joint — permits on-the-job stem shortening without re-threading.
LOW BRIGHTNESS IN 30°-90° ZONE
New! Neck baffle provides 87° shielding.
90% EFFICIENT — new silvered-bowl lamp automatically restores unit to initial efficiency. Floor-level relamping with pole-type changer simplifies maintenance.

Silvray SUPER 1500 units provide highly-diffused indirect lighting for classrooms, libraries, drafting rooms, hospitals, and offices. Available as ceiling or pendant-type units in 150-200w, 300-500w, and 750-1000w sizes. SUPER 1500 fixtures completely eliminate glare — both direct and reflected.

1927 • 1952 OUR 25TH YEAR **Silvray** *ALWAYS... the best in lighting*

Smoot-Holman, Inc. of Inglewood, Cal. — west coast licensee.

Get complete details, mail this coupon today!

SILVRAY Lighting, Inc., 109 West Main St., Bound Brook, N. J.

Gentlemen:

Please send me further information on the Silvray SUPER 1500 unit.

Name_____

Firm_____ Title_____

Address_____

City_____ Zone____ State_____

All concentric-ring fixtures for use with silvered-bowl lamps are covered by U.S. Pat. #2,303,747 owned by Silvray Lighting, Inc.

The best of everything electrical . . . via GraybaR

here it is!

A COMPLETELY NEW APPROACH TO OVERALL LIGHTING...

Smithcraft area illumination

NOW . . . advanced design fulfills all the possibilities and benefits promised by overall lighting! Smithcraft Area Illumination is a complete fluorescent lighting system free from all the limitations and mechanical difficulties of previous attempts, yet it is not "custom built" to each installation. Skillfully engineered with unbelievable simplicity, Smithcraft Area Illumination when installed becomes a lighting "fixture" of limitless dimensions, shapes and patterns with unrestricted selection of shielding media and varied intensities within the system. For those who plan, recommend and install, here is an important new tool and business-producer; for the user, Smithcraft Area Illumination opens up exciting new possibilities for effect combined with illumination of unequalled quality.

architects

To the architect, **Smithcraft Area Illumination** presents a new opportunity for freedom of expression in the integrating of lighting interiors within interior design. Here is freedom of choice with no restrictions as to **size, pattern, intensity, shielding,** and **periphery.**

engineers

Engineers can now specify **and get** any required level of intensity. Or **different** intensities for different sections of an installation may be recommended to permit optimum usage of store or office areas. Alternating light, rows of lighting, or banks of lighting are possible because of flexibility of switching and a specially designed wiring system.

contractors

Ease and economy of installation are truly amazing! **Smithcraft Area Illumination** is actually installed in far less time than any combination of ceiling and illumination currently available. No careful dimensioning is required and no special tools, rules, or gadgets. From the time the hangers are in position on the ceiling to the finished installation, only a water level and small screwdriver are required.

owners

For those who own buildings and businesses of many kinds, **Smithcraft Area Illumination** is a **profitable** and practical investment. Versatile and adaptable, here is highest quality illumination combined with appearance and effect that **sells** and **produces.** Its ease of maintenance and adaptability to future plans and developments are factors that interest any businessman. Yet, its initial cost is comparable to that of a suspended ceiling and troffer system.

America's finest fluorescent fixtures **Smithcraft**
LIGHTING DIVISION
CHELSEA 50 MASSACHUSETTS

Send now for further information on Smithcraft Area Illumination.

The best of everything electrical . . . via GraybaR

S Service... D Dependability... S Satisfaction... in Signaling!

UNIPACT 2000 BELL

Need an entire new system? Or perhaps just one unit that meets present noise level needs? Buy UNIPACT. It's the best. UNIPACT is a tailor-made group of signals that are designed to master department noise levels with 17 interchangeable units—bells, buzzers, horns, chimes—all fitting one standard adapter plate. No new wiring is needed. Plant conversion is easier. Buy the proven brand—FARADAY.

FIRE ALARMS

Fire is under control from the start with a Sperti Faraday Fire Alarm System. Fire Alarm Stations, Sounding Devices, Control Panels are designed to give a fast, efficient system that stays on the job 24 hours a day.

HOSPITAL SYSTEMS

Whether it's Nurses' Call, Doctors In-and-Out Registers, Corridor Paging, or a variety of other proven hospital audible or visual signal devices, you're sure with a NAME BRAND—FARADAY. They give fast, efficient performance with a trouble-free signal system that has proven itself in hundreds of installations across the country. Write for new catalog.

HOLTZER CABOT . . . STANLEY & PATTERSON . . . FARADAY

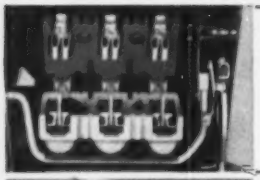
Consolidated by:

Sperti Faraday Inc

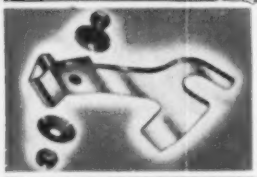
ADRIAN, MICHIGAN

BELLS · BUZZERS · HORNS · CHIMES · VISUAL AND AUDIBLE PAGING DEVICES AND SYSTEMS

The best of everything electrical . . . via GraybaR



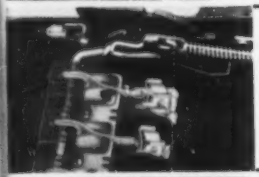
Magnetic Arc Suppressors
"blow out" the arc, contribute to exceptionally high interrupting capacity.



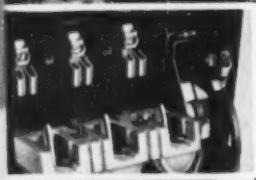
Spring-Loaded Blade Hinges
for pressure contact. **Silver plated** current-carrying parts. Not flash plated but completely plated to reduce temperature rise.

Positive Pressure Fuse Clips
reduce heating at fuse contacts 60% or more.

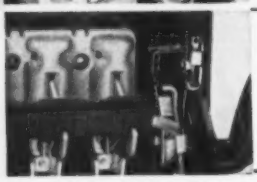
Padlock Attachment
locks switch "ON" or "OFF" with 1, 2, 3 or 4 padlocks of virtually any shape or size.



True Quick-Make, Quick-Break
Mechanism design makes it impossible to retard or to "tease" the operation.



Dead Front
construction. All exposed parts are dead when switch is in "OFF" position. **Hinged Arc Barrier** makes it easy to reach line terminals.

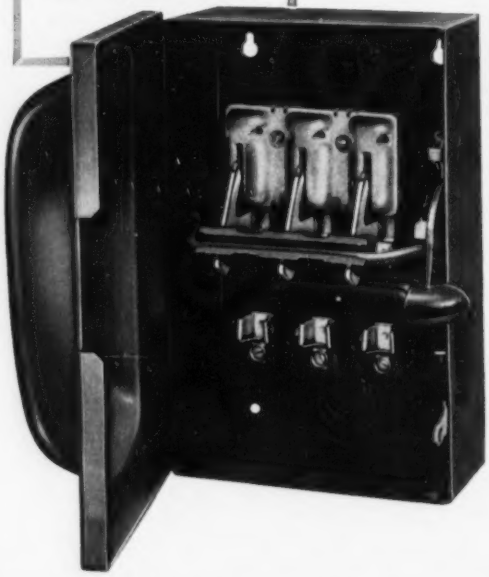


Full Cover Interlock
Switch cover can be opened or closed by authorized personnel without removing parts or interrupting service.

FACT:
Square D Type A Safety Switches are the overwhelming first choice of industry

REASON:
DESIGN LEADERSHIP

PROOF:
a feature-by-feature comparison



SAFETY SWITCHES
and other Square D products distributed by GRAYBAR

SQUARE D COMPANY

The best of everything electrical . . . via GraybaR

Pull Any Size Pole *Easier*

with the NEW *Light-Weight* SIMPLEX ALUMINUM POLE JACK

POWERFUL! RUGGED! DEPENDABLE!

CABLE REEL JACKS
Double-acting and single-acting ratchet lever types or screw type. One to 10-ton capacities. Field model available soon with light-weight aluminum housing.

AERIAL CABLE AND WIRE TENSIONING JACK
Capacity 5 tons.

MANHOLE SHEAVE
Handles up to 3-inches diameter cable or any size winch line.

JUNIOR POLE JACK NO. 325
Pulls or straightens poles up to 30 feet high. 5-ton capacity.

Here's the first time and labor saving improvement in pole jacking in 25 years! New aluminum housing on The Simplex heavy-duty Pole Jack eliminates 35 pounds of weight, without sacrificing a pound of lifting capacity. You can pull or straighten poles, pull butts or move loaded poles without interruption to service — and without digging. Only 60 pounds in weight, it's easy to move from job to job; saves time and work.

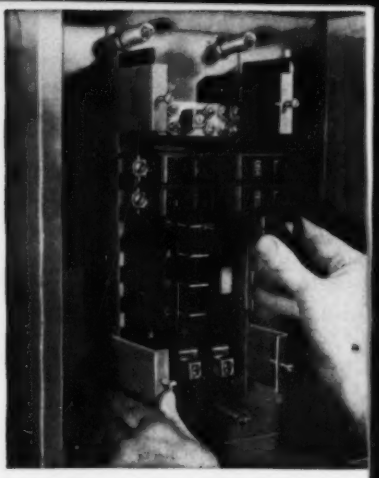
This new Simplex No. A-1538 Aluminum Pole Jack has the better-performance and long-lasting construction features that made its predecessor—the famous Simplex No. 329 with malleable housing—the standard Pole Jack of the Bell Systems. The husky "I" beam base gives a firm foundation; jack pivots on the base when pawl is disengaged. The A-1538 has 15-ton capacity and 22-inch lift. Comes completly equipped with steel chain and lever bar.

Get full information now from your Graybar Branch, or write for Catalog No. 50

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

TtempleTon, Kenly & company
1046 South Central Avenue, Chicago 44, Illinois

The best of everything electrical . . . via GraybaR



ANOTHER TALKING POINT IS THE BREAKER—Trumbull's new NLTQ Panelboard introduces the first *plug-in* circuit breaker with quick-make, quick-break operation. Other features: both *thermal* and *magnetic* protection . . . trip-free . . . pressure-type, silver-plated copper plug-in contacts . . . all ratings physically interchangeable. Adjacent breakers are on alternate phases—assuring balanced loads and circuits.

New insulating material

MAKES PANELBOARD SALES!

The base of this panelboard interior is made of *Plastisol* . . . the first time this amazing plastic material has been used for this purpose.

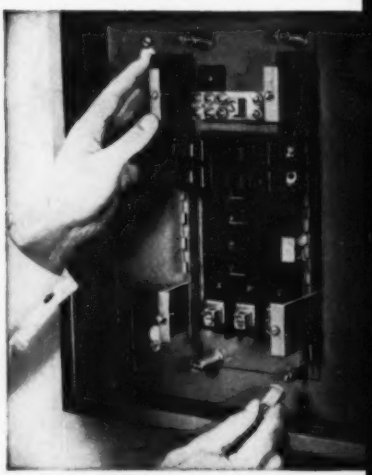
Here are some reasons for your recommending Trumbull's new NLTQ Panelboard to your customers.

Plastisol has very high thermal conductivity and is an excellent radiator of heat. Copper bus bars encased in Plastisol run 10% cooler than in open air!

SALES POINTS THAT OUT-SELL OTHER INSULATION

Other Plastisol advantages making it superior to all other types of insulation for this purpose include its ability to resist acid and alkali, high temperatures (not harmed at 212 F), tracking and carbonizing. It will not shrink or become brittle, even at minus 30 F.

Trumbull's Plastisol base is Underwriters' Laboratories, Inc. approved and endorsed by the Electrical Council.



YOUR CUSTOMERS WILL LIKE QUICK INSTALLATION—Interior is mounted in box by compression springs . . . which permit easy release for removal. Springs also permit lining up fronts regardless of uneven box installation. Trumbull NLTQ panelboards with lug or circuit breaker mains come in capacities up to 225 amperes in a range of 4 to 42 circuits. Write for Bulletin TEB-14.

TRUMBULL (T) ELECTRIC

DEPARTMENT OF GENERAL ELECTRIC COMPANY
PLAINVILLE, CONN.

The best of everything electrical . . . via GraybaR

T&B METHOD
Fittings and Tools for ALUMINUM and Copper Conductors

FOR ACSR & ALL ALUMINUM CABLES

Tension Splicers

Dead Ends

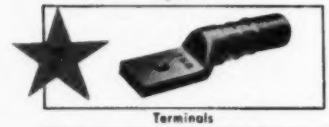
Jumper Splicers

Repair Sleeves

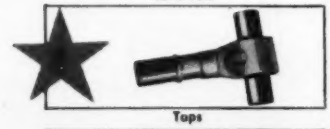
Light Portable Tools (for tower work)

FOR UNDERGROUND & INDOOR INSTALLATION

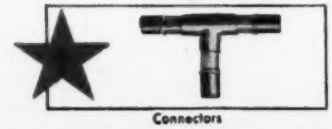
Splicers



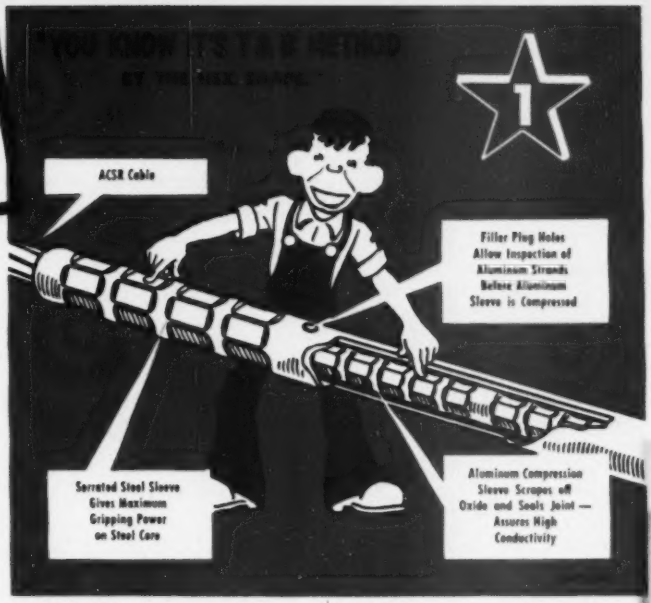
Terminals



Taps



Connectors


1
ACSR Cable
Filler Plug Holes Allow Inspection of Aluminum Strands Before Aluminum Sleeve is Compressed
Serrated Steel Sleeve Gives Maximum Gripping Power on Steel Core
Aluminum Compression Sleeve Scrapes off Oxide and Seals Joint — Assures High Conductivity

ACSR Tension Splicers develop minimum of 95% of cable strength

—when installed by the T & B Method

T & B Method Tension Splicers for ACSR are light in weight, easy to install. They take a tight, lasting grip on both steel core and aluminum conductor strands. Inside taper at ends of splice provides dampening effect to prevent vibration failures. Patented T & B Method of compression develops a minimum of 95% of ultimate breaking strength of cable—with a conductivity better than the cable!

Tooling is Light — Portable — Powerful . . . and Economical!

Tools are easy to carry—easy to use on the tower. An installing head weighing only 34 pounds develops 40-ton pressure. The T & B Method saves you money because one tool and die install all fittings — tension splicers, dead ends, jumper loop splicers—for a single size of ACSR cable.

ENGINEERED RIGHT . . . DISTRIBUTED RIGHT

T & B Method fittings and tools, like all T & B quality fittings, are designed for lowest installed costs. They're furnished exclusively through local T & B distributors under the T & B Plan.

FROM CIRCLE TO HEX IN SECONDS

You start with a circular cable (a typical one consists of about 75% metal, 25% air). You compress it, by the T & B Method, to the equivalent area of a solid rod—as the dies force the fitting from circular to the characteristic T & B Method hexagonal shape—all in the space of just a few seconds!

FOR THE FULL STORY ON THE T & B METHOD, WRITE FOR BULLETIN #67

THE THOMAS & BETTS CO.

INCORPORATED

35 Butler Street
Elizabeth 1, New Jersey
Thomas & Betts, Ltd., Montreal, P. Q., Canada

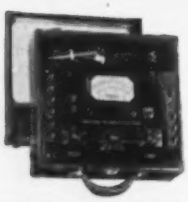
THERE'S A T&B ENGINEERED PRODUCT for every wiring job in the complete T & B line of fittings for all conductors and raceways

Manufacturers of Electrical Fittings since 1898

The best of everything electrical . . . via GraybaR

Dependable Electrical Measurements

FOR LABORATORY—PRODUCTION TESTING—MAINTENANCE



INDUSTRIAL CIRCUIT TESTER

(Model 785) A multi-range, multi-purpose, ultra-sensitive analyzer, for laboratory and industrial checking of electrical and electronic circuits. Has 28 practical scale ranges; measures d-c and a-c voltage, d-c and a-c current, and resistance. Accessories available to extend ranges. Compact and portable; furnished in either oak or steel case.

ULTRA SENSITIVE PORTABLE TEST INSTRUMENTS

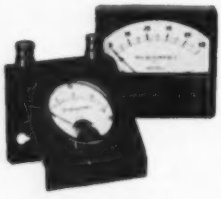
(Model 622) High sensitivity, large scale A-C and D-C instruments of double pivoted type, ideal for precision measurement of low potentials and minute current. Available in single or multi range as D-C voltmeters, millivoltmeters, milliammeters, microammeters; and milliammeters and voltmeters in thermo and rectifier types for RF and A-C.

A-C AND D-C PORTABLE TEST INSTRUMENTS

(Model 931) Comprising a group of matched a-c and d-c portable test instruments; the universal favorites for highly accurate general test work. Available as voltmeters, ammeters, d-c and single phase a-c wattmeters—a-c and d-c voltmeters. Long, readable hand-calibrated mirror scales. The d-c instruments have new self-shielding mechanism.

HIGH FREQUENCY ELECTRONIC ANALYZER

(Model 769) A three-in-one instrument providing a self-contained Volt-Ohm-Milliammeter, a high impedance electronic D-C Volt-Ohmmeter, and a probe type vacuum tube voltmeter for use to 300 megacycles. Exceptionally stable and accurate. Has specially designed extremely small RF and D-C probes.



PANEL INSTRUMENTS OF HIGH SENSITIVITY

In all types, sizes and ranges for all critical measurements encountered in electronics, nuclear research and general testing. All D-C, rectifier type A-C and RF instruments have built-in magnetic shunts for minor adjustments if necessary.

A-C CLAMP VOLT-AMMETER

(Model 633, Type VA-1) For convenient and rapid measurement of a-c voltage and current without breaking the circuit. Jaws take insulated or non-insulated conductors up to 2" diameter. Safe, rugged, versatile. Also available as a-c clamp ammeter, without voltage ranges.

Literature on these and other WESTON instruments for electrical and electronic requirements sent on request.
WESTON Electrical Instrument Corporation, 617 Frelinghuysen Avenue, Newark 5, New Jersey
. . . manufacturers of Weston and TAG instruments.

285

WESTON *Instruments*

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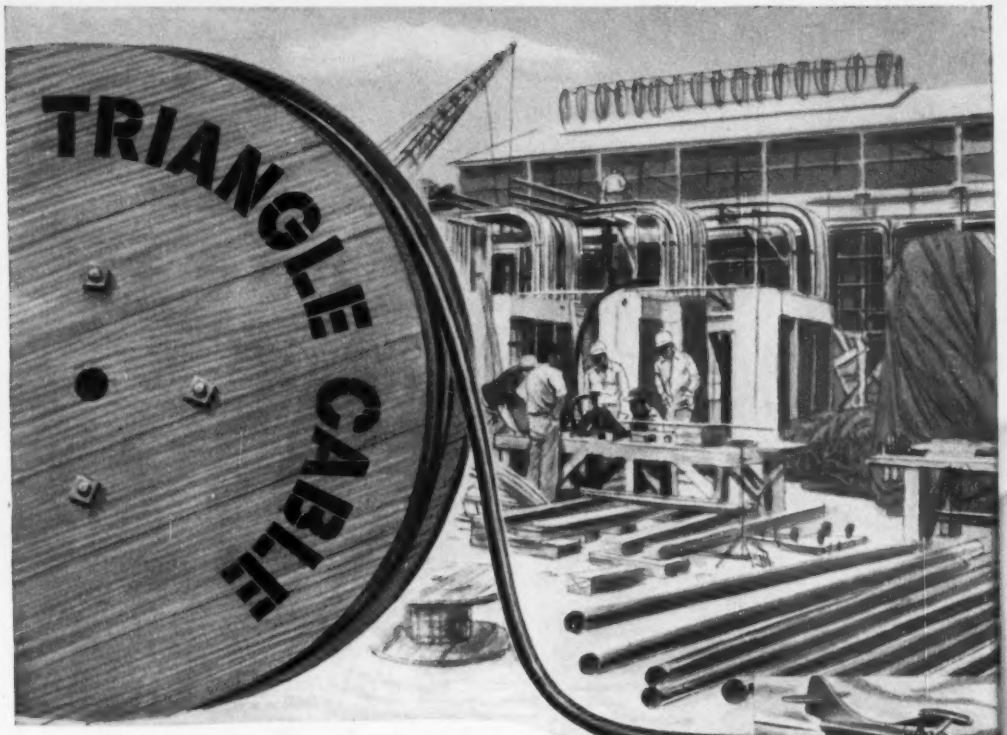
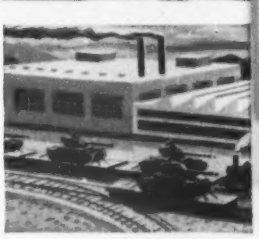


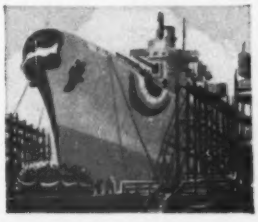
A DEPENDABLE SIGN...

that America is expanding

Thanks in great part to you who harness electricity, America is expanding rapidly in the face of world tension.

As America strengthens its defenses, the YELLOW TRIANGLE REEL and the stack of Triangle conduit become more and more familiar sights. Engineers and contractors—demanding quality wire, cable and conduit—know that ***YOU CAN DEPEND ON TRIANGLE and on the ELECTRICAL DISTRIBUTOR.***





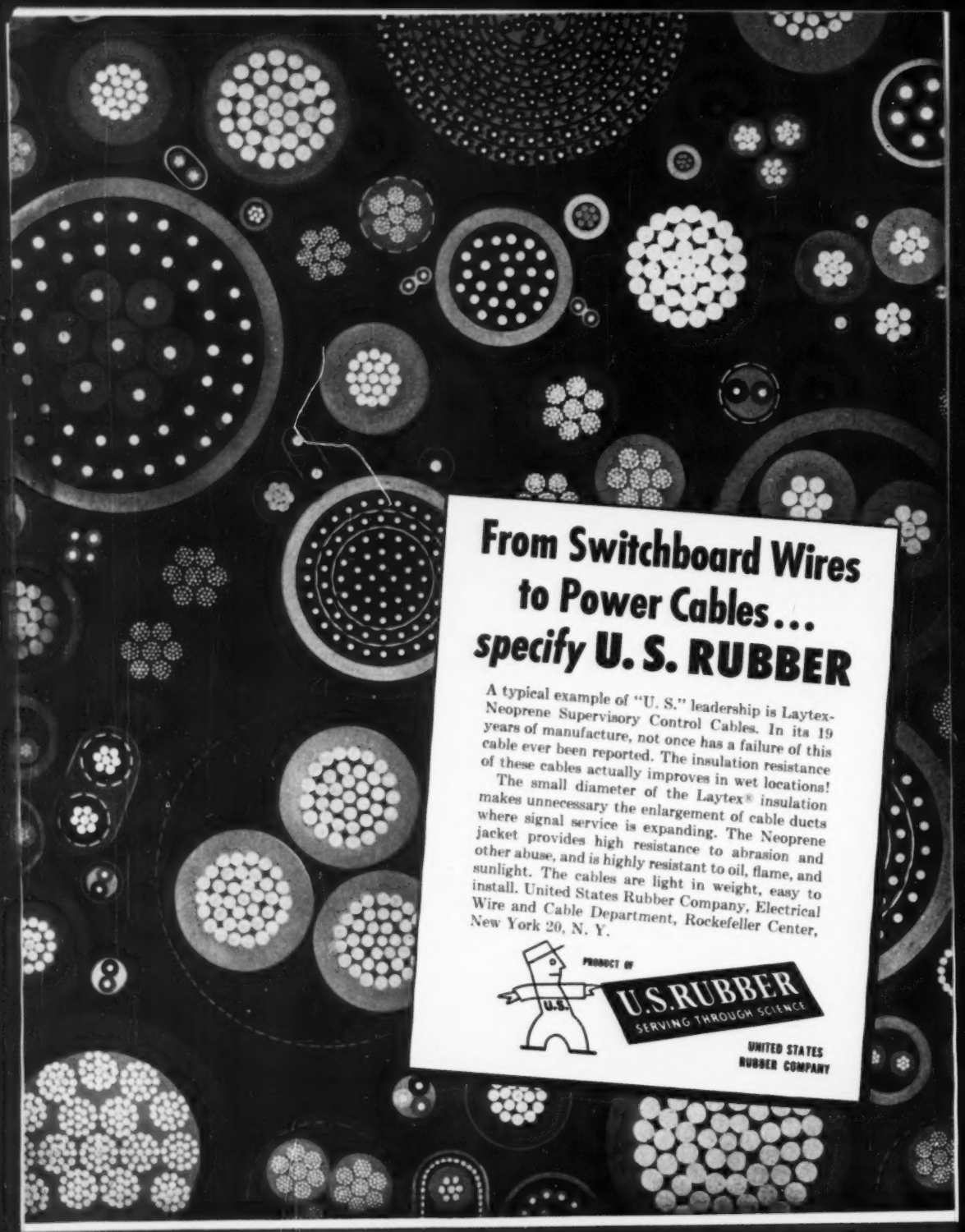
The Trade-mark of Top Quality

CONDUIT & CABLE CO., INC.

NEW BRUNSWICK, NEW JERSEY

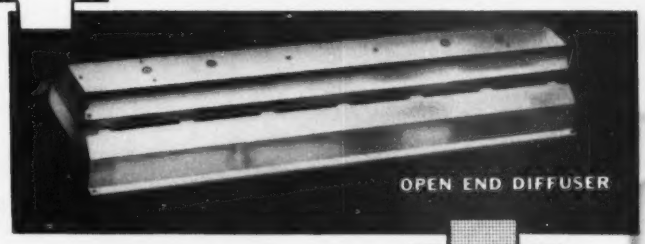
"Glazon" Building Wire · "Glazon" Non-Metallic Sheathed Cable · Control Wire · Armored Cable · Service Entrance, Service Drop, Varnished Cambric Braided or Leaded, Trioprene Trench, Power & Parkway Cables · Bare Wire · Rigid Conduit Hot-Dipped Galvanized & Black Enameled · Electric Metallic Thin Wall Conduit · Flexible Steel Conduit.

The best of everything electrical . . . via GraybaR


From Switchboard Wires to Power Cables... specify U. S. RUBBER
A typical example of "U. S." leadership is Laytex-Neoprene Supervisory Control Cables. In its 19 years of manufacture, not once has a failure of this cable ever been reported. The insulation resistance of these cables actually improves in wet locations!
The small diameter of the Laytex® insulation makes unnecessary the enlargement of cable ducts where signal service is expanding. The Neoprene jacket provides high resistance to abrasion and other abuse, and is highly resistant to oil, flame, and sunlight. The cables are light in weight, easy to install. United States Rubber Company, Electrical Wire and Cable Department, Rockefeller Center, New York 20, N. Y.
PRODUCT OF
U.S.RUBBER
SERVING THROUGH SCIENCE
UNITED STATES RUBBER COMPANY

The best of everything electrical . . . via GraybaR

UP and DOWN LIGHTING
for better seeing conditions



Wheeler
DIFFUSER TYPE
FLUORESCENT FIXTURES

Get the benefits of greater seeing comfort — reduced brightness contrasts — with the new DIFFUSER TYPE Fluorescent Fixtures — pioneered by Wheeler! Apertures located in the top of the all-white porcelain enameled steel reflector direct approximately 5% of the light upwards . . lessen contrasts . . provide more comfortable seeing and working conditions. Fixtures are available for use with all Slimline and General Line Fluorescent Lamps. Write Wheeler Reflector Company, 275 Congress Street, Boston 10, Massachusetts.

Wheeler REFLECTORS

Distributed Exclusively Through Electrical Wholesalers

MADE BY SPECIALISTS IN "SKILLED LIGHTING" EQUIPMENT SINCE 1881

The best of everything electrical . . . via GraybaR

Graybar ACTION-SERVICE

is as near as your telephone

For poles and cross arms . . . *wire and strand . . .* *insulators and hardware . . .* *trailers and linemen's tools . . .* *safety equipment and protective devices . . .* *connectors and clamps . . .* *for every electrical need — call your near-by Graybar office. Efficient, friendly service . . . helpful assistance from capable Graybar personnel . . .* *a nation-wide network of supply stations to serve you — these are some of the reasons why a call to Graybar means the best possible service on all your orders.*

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Birmingham
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Phoenix
ARKANSAS
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Fresno
Long Beach
Los Angeles
Oakland
Sacramento
San Diego
San Francisco
COLORADO
Denver
CONNECTICUT
New Haven
West Hartford
DELAWARE
Wilmington
DISTRICT OF COLUMBIA
Washington
FLORIDA
Jacksonville
Miami
Orlando
Tampa
GEORGIA
Atlanta
Savannah
IDAHO
Boise
ILLINOIS
Chicago
Peoria

INDIANA
Evansville
Hammond
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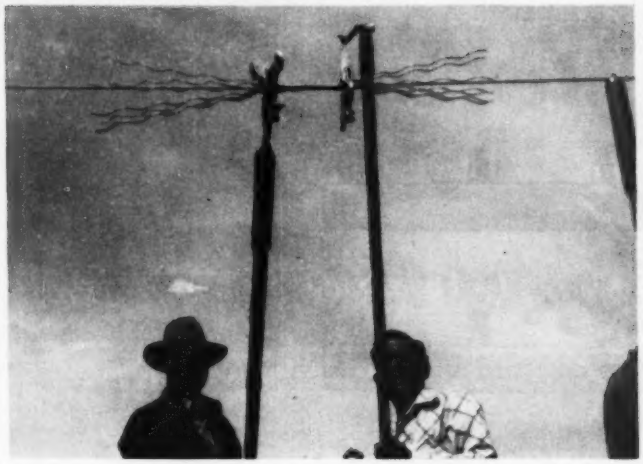
Everything for your Pole Lines via Graybar

NEW EQUIPMENT

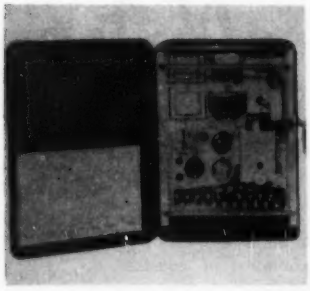


Armor Rod Die

This new type of tool for applying preformed armor rods has been developed recently. Tools for several years have been used to apply armor rods with hot sticks. This same method, as was used for applying straight armor rods, is used to apply preformed rods even faster than the straight.

The company reports this means a complete armor roding job on a three-phase line can be done in less than two hours including the time required to mount hot line tools on the pole and remove them when the job is done. The big advantage is in saving the time required to apply end clips hot when straight rods are used.

A. B. Chance Co, Centralia, Mo.



Flame Failure Safeguard

The new Fireye photoelectric flame failure safeguard protects semi-automatic or manually-fired gas, oil and combination burners. This equipment maintains guard against flame failure, and when a flame fails fuel is cut off. It can also be wired to sound an alarm if desired.

The system consists of an electronic control and a scanner. The control is housed in a sturdy dust-tight steel case and contains power supply and relay system.

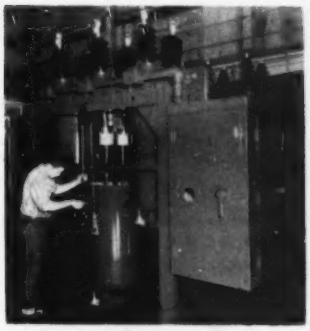
Combustion Control Corp, Cambridge, 42, Mass.

Outdoor Power Circuit Breakers

A new line of outdoor power circuit breakers for distribution and subtransmission applications has been announced by the company.

The breakers are available in ratings of 14.4 to 46 kv, 600 and 1200 amp and interrupting ratings from 250 through 1,500 Mva are also available.

New oil-blast interrupters reportedly are designed to reduce oil carbonization by interrupting fault and load currents with short arc lengths and low arc energy. Silver-molybdenum



contact surfaces for low contact resistance and minimum erosion of contact material during interruption of fault arcs are used. Contacts may be easily removed for contact inspection without disturbing breaker adjustments.

Operating mechanism of the breaker is pneumatically trip free. The unit has a float-type oil gauge and provision for two current transformers per bushing.

General Electric Co, Schenectady 5, N. Y.

High Intensity Runway Light

A redesigned high intensity runway light for outlining airport runways during night and bad weather landings is now available.

The light which operates from three independent 6.6-amp series circuits, has a medium intensity light in the top element and one of high intensity in each end. Top elements are used principally for good weather night landings while end elements are designed to penetrate fog, haze and smoke. The top element holds either a 30-w or a 45-w lamp and the end elements take a 95-w PAR 46 or PAR 56 high intensity lamp.

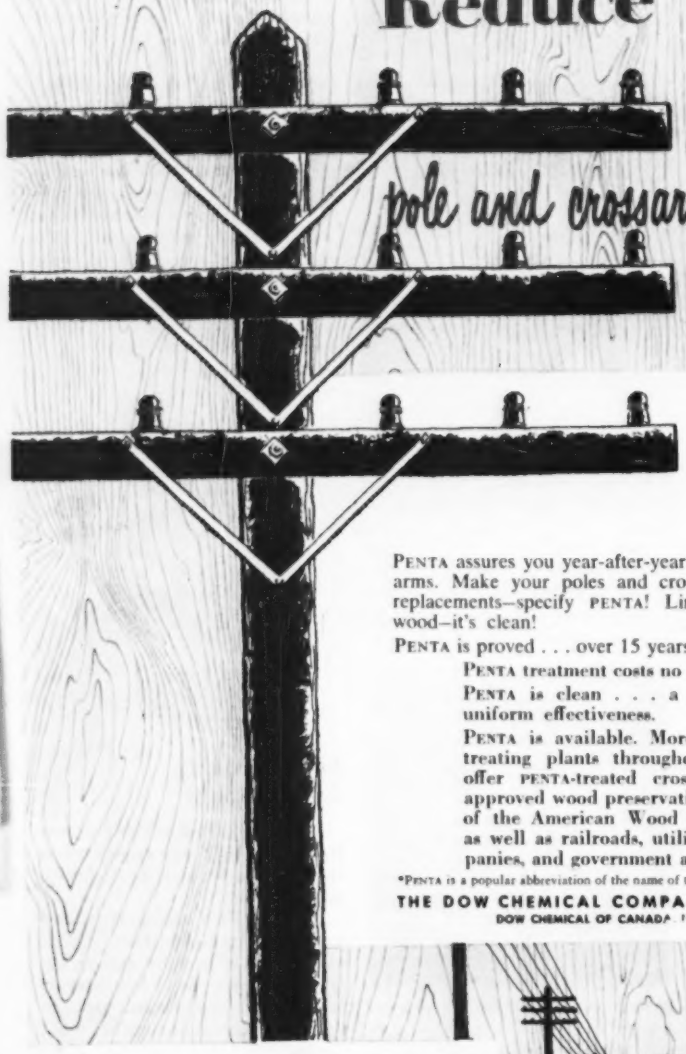
The medium intensity lens is now one piece and a new harness-type assembly has been added to the runway light.

Westinghouse Electric Corp, Pittsburgh 30, Pa.

Reduce

pole and crossarm replacement with

Penta*



PENTA assures you year-after-year protection for poles and crossarms. Make your poles and crossarms last longer and reduce replacements—specify PENTA! Linemen like PENTA-PROTECTED wood—it's clean!

PENTA is proved . . . over 15 years of unsurpassed service records.

PENTA treatment costs no more.

PENTA is clean . . . a chemical of constant, uniform effectiveness.

PENTA is available. More than 60 commercial treating plants throughout the United States offer PENTA-treated crossarms and poles. An approved wood preservative, PENTA is a standard of the American Wood Preservers Association as well as railroads, utility and telephone companies, and government agencies.

*PENTA is a popular abbreviation of the name of the chemical PENTAchlorophenol.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

DOW CHEMICAL OF CANADA LIMITED, TORONTO, ONTARIO

Write *to Dow for*

- ☐ *Booklet "Pointers on PENTA"*
- ☐ *Source for PENTA-treated Poles*
- ☐ *Source for PENTA-treated Crossarms*
- ☐ *Source for PENTA-treated Construction Lumber*

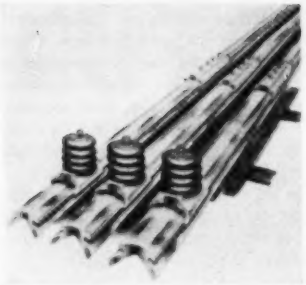
The Dow Chemical Company
Dept. PE 7 - Midland, Michigan

Name _____ Title _____

Company _____

Address _____

City _____ State _____



Aluminum Conductor System

A new aluminum (third rail) conductor system has been developed recently. Called Keystone, the new system reportedly obsoletes the need of improvising structural shapes such as steel railroad rails or steel or copper angles, tees, bars or wire to feed power moving equipment.

Maximum efficiency of current transfer is said to be accomplished through careful integration in design of collector, conductor and accessory components. Other advantages are elimination of corrosion problems, maintenance of conductor alignment, reduction of shipping, handling, erection and supporting member costs, etc.

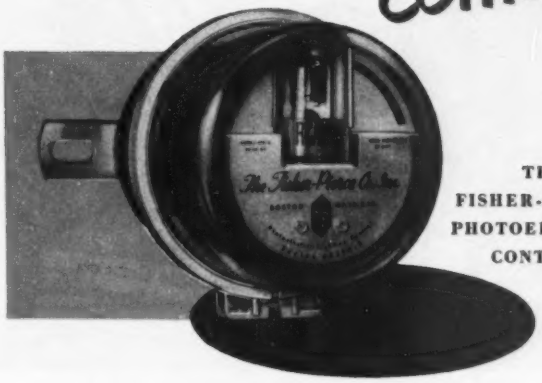
It is stated to be particularly desirable on long ac installations because of its non-inductive nature. Aluminum in this system may be spaced on close centers to achieve low reactance drops previously obtainable only with copper systems.

Electric Service Mfg Co, 17th and Cambria St, Philadelphia 32, Pa.

Sound-Survey Meter

Smaller, lighter in weight, easier to use and much lower in cost than standard sound-level meters, the new GR type 1555-A Sound-Survey Meter has a wide range of applications in nearly all fields of sound measure-

for true economy in street light control



THE FISHER-PIERCE PHOTOELECTRIC CONTROL

• LOW INITIAL COST
• LOW INSTALLATION COST
• LOW MAINTENANCE COST

The *cost* of control of street lighting includes more than just the price of the control itself. Cost of installation is another major factor. Maintenance costs, if too great, can overcome all other economies.

The F-P Series 63300B Control combines *all three* elements of economy. No control of similar specifications has as low a purchase price. None requires fewer man hours for installation. No other control has equalled the F-P record for maintenance economy.

Fisher-Pierce is able to provide this economy in street lighting control because of its years of experience and its extensive engineering organization. Fisher-Pierce Controls have been proven by the experience of over 700 utilities now using more than 35,000 Fisher-Pierce units.

If you are considering adding to or modernizing your street lighting, be sure to investigate the possibilities of Fisher-Pierce photoelectric controls.

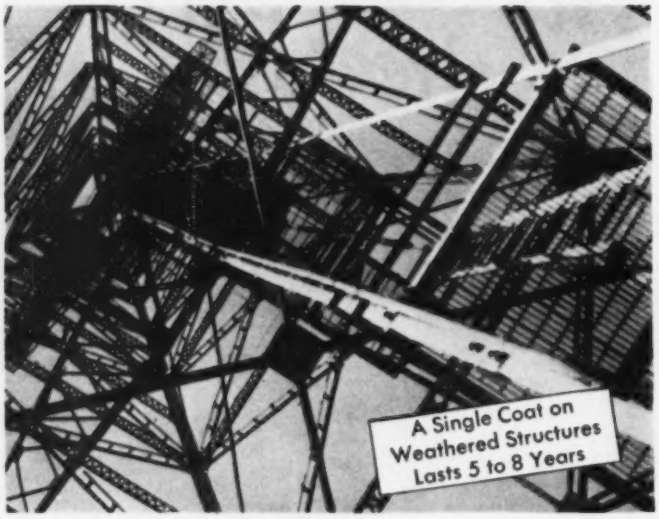
Write for Bulletin 63300B.

The FISHER-PIERCE CO., Inc.
82 Pearl St., So. Braintree, Boston 85, Mass.

EXPORT: PHILIPS EXPORT CORP. 100 E. 42nd STREET NEW YORK 17, N.Y.

IN CANADA: NORTHERN ELECTRIC CO., Ltd.

SUBOX PAINTS BEST FOR LOW COST PRESERVATION OF GALVANIZED TOWERS



On transmission towers, substation steel, fences and other galvanized structures, long-term tests have proved that painting with Subox and Subalox anti-corrosive paints is the surest, most economical *preventive maintenance*.

Galvanized structures painted with Subox and Subalox when weathered to first sign of rust, can be conserved better, at lower cost and the job will be easier, too.

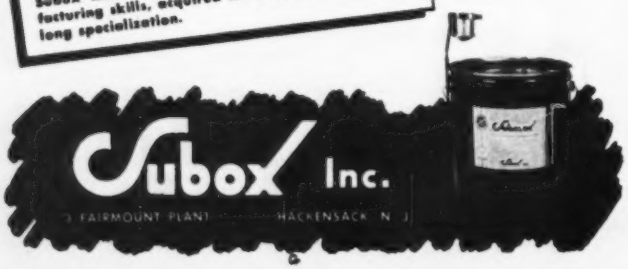
Subox and Subalox anti-corrosive paints are superior for galvanized surfaces. Not only do they bond efficiently to the surface, but they have the special properties for putting a tough, weather-resistant armor on the structure with a single coat. They will not chip, crack or blister during years of exposure to the elements.

The basic pigment in SUBOX and SUBALOX paints is active suboxide of lead — the finest anti-corrosion base.

25 Years of Distinguished Service

Industrial users everywhere in the United States and Canada attest to the quarter century of Subox leadership in preventive maintenance with anti-corrosive paints. There is no substitute for Subox' knowledge of the subject, or for its manufacturing skills, acquired the only sure way — by long specialization.

For all the facts, write today for a free copy of the study, "Paint Galvanized Transmission Towers for Long Life".

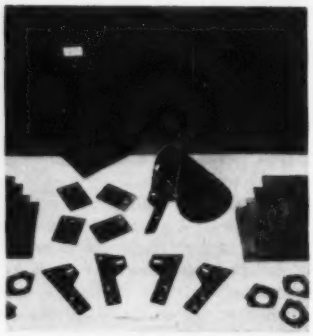


ment and acoustical measurement.

Among the industrial uses of the instrument are the measurement of transformer noise, machinery noise, etc. Architects and field engineers will find it convenient to use the meter because of its pocket size and light weight (1 lb, 14 oz with batteries).

The total sound-pressure-level range of the meter is from 40 to 136 db and three frequency weighting networks are provided.

General Radio Co, Cambridge 39, Mass.



Insulating Material

A new thin gauge insulating material made from glass fiber reinforced polyester is said to be highly resistant to high temperatures in electrical apparatus. The material is said to have good arc tracking resistance and exceptional dimensional stability.

Called Glastic-940, it will not flake and separate as does mica sheeting, yet it offers far greater body and stiffness than treated fabric type insulation.

It is claimed the new 940 material is the only known glass mat reinforced laminate in production available in 1/32-in. thickness as required for special insulating applications such as relay build-ups, etc.

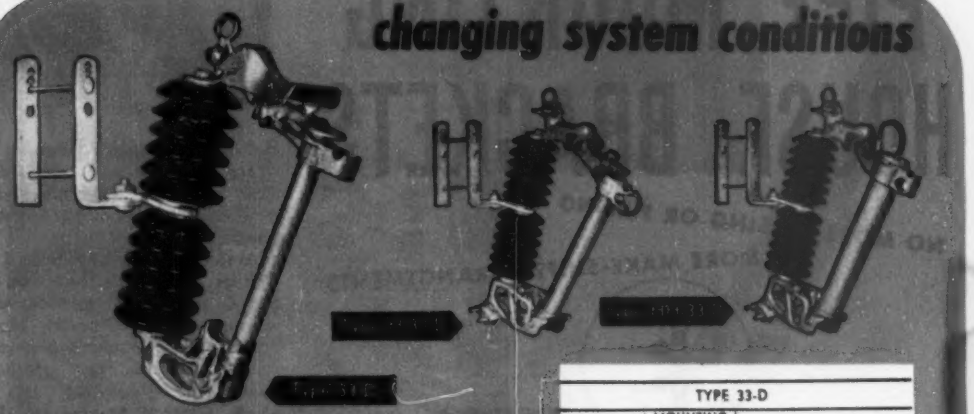
The Glastic Corp, Cleveland, Ohio

Single Phase Motors

A new addition has been announced to the line of U. S. vertical motors, a series of single-phase, hollowshaft motors.

An improved and simpler method of disconnecting the starting capacitors has been initiated into the motors, namely the accelerating type relay. It

CUTOUTS *easily adapted to meet changing system conditions*

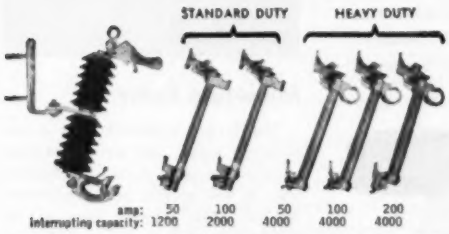


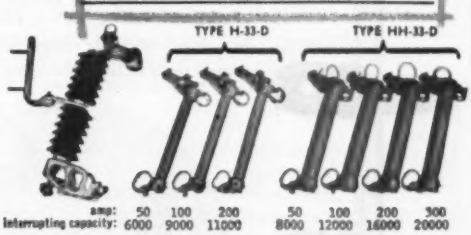
As loads and short circuit requirements continue to grow, it becomes increasingly important that distribution cutouts applied on your system today be easily and economically adapted for heavier duty.

The answer is simple! Southern States cutouts, through interchangeability of fuse holders, meet today's needs at the same time providing flexibility for future requirements.

With Southern States' open type distribution cutouts installed, the fuse protection capacity of your system can be increased at moderate cost.

TYPE 33-D			
CUTOUT RATING	MOUNTING CONTACT RATING	FUSE HOLDER RATING	
kv	amp	Continuous amp	Interrupting rms amp
15	100	50	1200
15	100	100	2000
15	100	50	4000
15	100	100	4000
15	200	200	4000
TYPE H-33-D			
15	200	50	4000
15	200	100	9000
15	200	200	11000
TYPE HH-33-D			
15	300	50	8000
15	300	100	12000
15	300	200	16000
15	300	300	20000





The 15 kv Type 33-D illustrated above, with five interchangeable fuse holders, indicates the degree of versatility possible in each voltage rating. Any one of the five holders above may be mechanically interchanged to achieve desired combinations of continuous current and interrupting capacities.

In converting from a lower rating to 200 ampere continuous rating, cutout mounting contacts must also be changed.

The Type H-33-D and HH-33-D are designed for heavier duty operation than the Type 33-D. As illustrated seven fuse holders will fit in either an H-33-D or HH-33-D mounting in a given voltage rating. However, the H-33-D has 200 ampere contacts and the HH-33-D has 300 ampere contacts and when fuse holders of 300 ampere continuous current capacity are installed in an H-33-D the mounting contacts must also be changed.

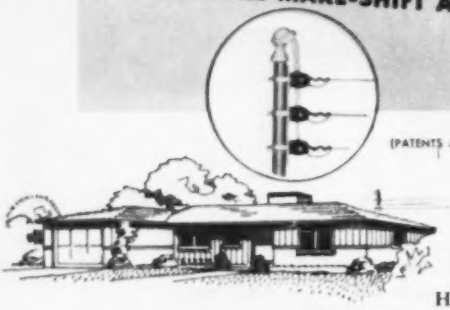
Only the 15 kv rating in each class is shown. The same pattern is followed in the 5 kv and 7.5 kv ratings.

Southern States Equipment Corp.
HAMPTON GEORGIA

It's new!

PIPE MOUNTING HOUSE BRACKETS

NO MORE FUSSING OR FUMING
NO MORE MAKE-SHIFT ARRANGEMENTS



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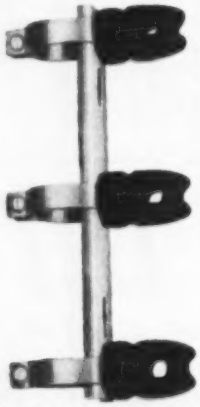
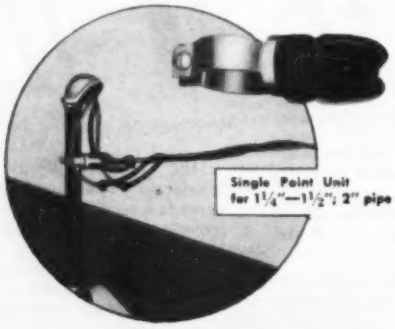


Three Point Unit 4½" or 6" wire spacing, for 2" and 2½" pipe

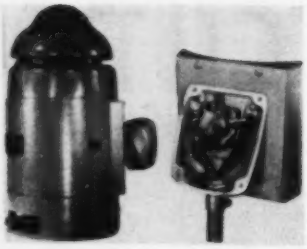
Here's just what you've wanted all along. Porcelain Products offers you the *first* easily attached, low priced Pipe Mounting House Bracket for use wherever you fasten electrical conductors to pipe. They're perfect for residential, industrial or rural wiring jobs . . . ideal for ranch type housing with wide eaves. Save time . . money . . avoid costly delays. Write for prices, literature.



Single Point Unit for 1¼"—1½"; 2" pipe

PP INC.

Porcelain Products, Inc.
FINDLAY, OHIO



replaces a centrifugal switch.

The relay is stated to give a fast, clean contact break. The large double break contacts insure long and trouble-free life.

Available in sizes from ½ to 5 hp with speeds of 1800 or 3600 rpm, the SCU-C and SCU-R motors features asbestos protection of windings, down draft ventilation, reverse protection clutch, conservatively rated capacitors, weatherproof housing, etc.

U. S. Electrical Motors, Inc, Los Angeles 54, Calif.

Miniature Relay

The Terado miniature relay is hermetically sealed and has an extreme sensitivity because of its high efficiency coil. It will operate on 75 milliwatts or less. The current carrying capacity is stated to be considerably greater than other relays of the same type because solid coin silver contacts are used throughout.

Terado Co, 1068 Raymond Ave, St Paul 8, Minn.

Fiberglas Insulation

A new electrical insulation made of braided fiberglas with a coating of silicone rubber has been developed recently. Known as BH 1151, it is a Class H insulation that offers high heat resistance and high flexibility.

Basic fiberglas braid has been

How Burndy Hysplicing Cut Installation Costs 70%

HYSPLICE

70% saved!

You may not repair overhead transit lines, but the story of how Seattle Transit System reduced splicing time on corroded guy wires from 20 minutes to 3 minutes may well apply to your operation.

The "secret" is the Burndy Hysplice installed with the Burndy Hypress Y48B, a portable hydraulic press weighing only 27 pounds but developing 40 tons, *80,000 pounds*, of force...a weight/force ratio unequalled for easy handling of splices and connections on larger cables.

In this application the corroded section is replaced with a three-foot length of new wire, coated at both ends with a corrosion resistant compound and inserted into the Hysplice. The enormous force of the Hypress crimps the Hysplice in a four-indentation die—completing each crimp in a single operation. Time? Just about three minutes to replace an entire section—even less if one side of the splice is made up in advance. A 70% time and manpower saving over the old fan splice method. And since the Hypress can install splices up to the rated breaking strength of a cable, pull-out tests prove its adaptability to any type of service in the field.

Perhaps costs can be cut, efficiency improved, in some phase of *your* operation. Call Connector Headquarters...

BURNDY

BURNDY ENGINEERING COMPANY • NORWALK, CONNECTICUT
BURNDY CANADA, LTD., TORONTO 8, ONT.

52-4

Wire and cable insulated with L·O·F Fiber·Glass are ideal for overhead or underground installations. Continuous-fiber textile yarn, 150 series, has many uses, such as electrical insulating tape and sleeving. High dielectric strength. Withstands temperatures up to 800° F.

Insulated wire cable resists heat, moisture, cold

Libbey·Owens·Ford adds quality Fiber·Glass insulation to long list of glass products

THE HIGH insulating efficiency of L·O·F Fiber·Glass permits greater compactness in design of wire and cable. It also allows them to withstand a wide range of temperatures and humidities.

Fiber·Glass is durable, too. It is unaffected by contact with moisture, oils, most acids and corrosive vapors. And when properly impregnated as a base for heat-resisting electrical varnishes, it has a substantially higher insulation resistance than most other textiles.

You will find that L·O·F Fiber·Glass meets a wide variety of applications, whether you make wire, cable, motors, generators, sleeving, magnet wire. Fiber·Glass yarn can be woven into cloth and tape, braided or wrapped on fine wire and plied or cabled into flexible cords.

If you'd like to talk about uses of Fiber·Glass in the electrical field, contact the nearest L·O·F office (district offices in 24 major cities). Or write, wire or phone Libbey·Owens·Ford, Dept. F·G 1062, Nicholas Building, Toledo 3, Ohio.

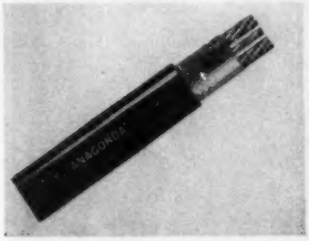
L·O·F FIBER·GLASS

LIBBEY·OWENS·FORD GLASS COMPANY
FIBER·GLASS DIVISION

FIBER·GLASS

treated to retard fraying and coated with silicon rubber fused to the braid. The result is a flexible tubing with reportedly superior resistance to dielectric breakdowns commonly caused by handling and operational stresses.

The new insulation is stated to meet applicable NEMA Class H specifications, and being completely inorganic will not support fungus growth. **Bentlay, Harris Mfg Co, Conshocken, Pa.**



Mining Machine Cable

A new portable mining machine cable has been developed recently. It reportedly reduces the chance of shock and arcing when a break occurs.

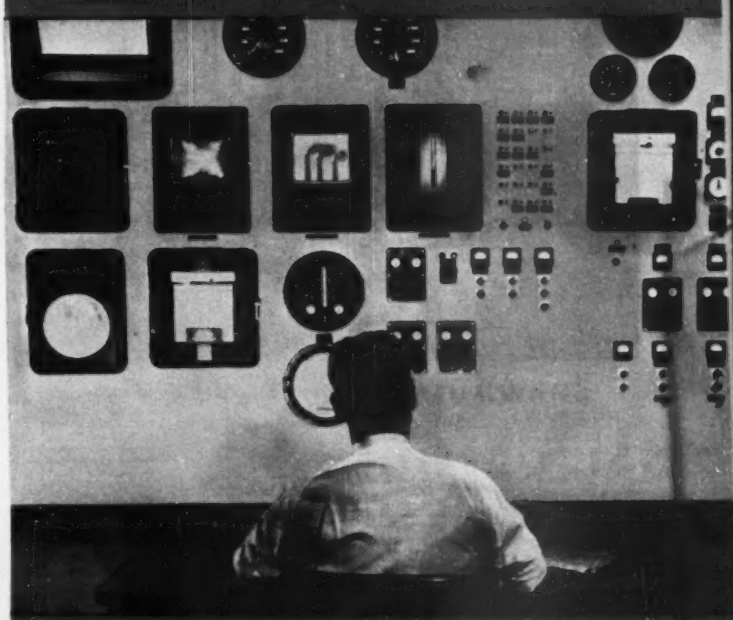
The cable is designed to cut off power the instant damage occurs to the positive conductor insulation. It is used in conjunction with a ground trip relay which, when energized, shuts the power off. It is especially adaptable for use with shuttle cars and other mobile mining machines. **Anaconda Wire and Cable Co, New York, N. Y.**

Home Heater

This new type of heating system utilizes electricity as fuel for convection-type heating that reportedly gives the maximum of effective heat without the need for furnaces, pipes, or chimneys.

These electric convectors employ a

DIAMOND "UTILISCOPE"
improves Centralized Control



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WRITE FOR BULLETIN 1025W

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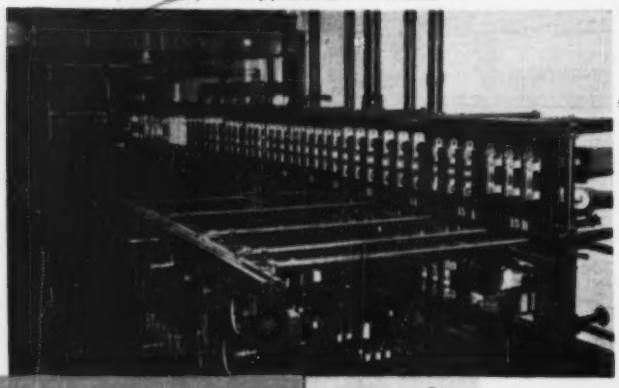
FIRST IN INDUSTRIAL TELEVISION
LANCASTER, OHIO • OFFICES IN 39 PRINCIPAL CITIES
Diamond Specialty Limited — Windsor, Ontario
Since 1903, Diamond has Manufactured
Quality Equipment For Industry

Anticipate* Destruction

Amp-trap PREVENTS DEVELOPMENT OF HEAVY SHORT CIRCUIT CURRENTS

* To preclude or prevent by prior action — Webster



SHAWMUT Amp-trap*

"T. M. REG. U.S. PAT. OFFICE"

Amp-trap installation at Bird & Son, E. Walpole, Mass., raised the interrupting capacity of the system from 20,000 amperes to 100,000 amperes R.M.S. at 600 Volts, 60 Cycles.

NEW, LOW-COST SHORT CIRCUIT PROTECTION

Amp-trap, with its 100,000 RMS Interrupting Capacity, opens the circuit so fast that it *precludes* the development of the peak available short circuit current. Consequently, it *prevents* both magnetic and thermal destruction. Even phase-to-ground faults are cleared so quickly that multi-conductor faults are usually avoided.

CERTIFIED AND APPROVED

Amp-trap is listed by Underwriters Laboratories. Interrupting tests up to 202,000 amps at 500v 60 cycles have been witnessed and certified by Electrical Testing Laboratories, Inc. Amp-trap is favored by many insurance companies.

FOR SYSTEMS OLD OR NEW

Amp-trap is supplied in all standard ratings up to 4000 amperes for application on any circuit up to 600 volts AC or DC. It can be used on either old or new switchgear with a minimum of structural rearrangement. "Outage" time for installation is negligible. There is no better way to insure your investment in switchgear, bus-ducts, motor starters, circuit breakers and current transformers. Every service entrance on a network system needs Amp-trap protection. The list of Amp-trap users reads like the Blue Book of American industry. Investigate now.

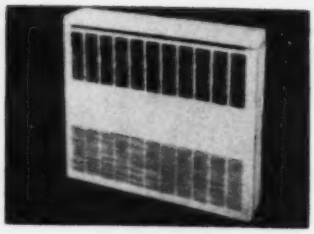
"You Can Get Amp-traps"

WRITE FOR FREE AMP-TRAP BULLETIN TODAY.

AMP-TRAPS — *Always At The Switch*

THE CHASE-SHAWMUT CO.

370 MERRIMAC STREET • NEWBURYPORT, MASSACHUSETTS



"fin" construction that eliminates fans, blowers or burning coils. The heater operates by drawing in cold air through lower vents and passing the air around concealed fins which are stated to completely and evenly warm the air with efficient "black heat." This warm air is then radiated through upper louvres and circulated around the room.

Paley Mfg Co, Brooklyn, N. Y.

Rubber Sleeve

A special design rubber sleeve called Flex-Fit has been developed recently. The high wide shoulders are buckled together across the chest and back and reportedly give complete protection, up to 20,000 v, to linemen working aloft.

It is claimed that pure rubber stock is dipped to form the sleeves which are without stiff molded seams and therefore are both more flexible and longer wearing.

Charleston Rubber Co, Stark Industrial Park, Charleston, S. C.

Snap-Action Switch

A water-proof, snap-action switch that incorporates potted, waterproof terminal leads and a hermetically sealed contact chamber has been announced recently.

The new design, type 4HS, reportedly makes possible the use of

Joslyn *Fast Action* CUTOUT

Engineered for Reliability

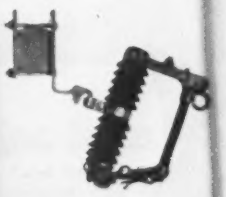
Serves Distribution Systems more Effectively

Available in ratings of 7.8 and 15 kv, 100 amp.

Pole and Cross Arm Mounting

1

General Purpose Fuse Cutout - fast pull out with rapid current interruption - delayed, full drop-out after clearing, preventing arcing at contacts. Will take any universal type fuse link within its rating.



2

All the features of 1 plus the patented low cost Load Breaker attachment enabling manual interruption of loads up to 100 amperes for capacitor banks, small substations, line sectionalizing, etc.

3

All the features of 1 and 2 plus the positive protection against lightning provided by the Joslyn Arrester in an effective compact unit with the extra advantages of safety, space-saving and low cost.

JOSLYN 1902 1952 50th ANNIVERSARY

Joslyn MFG. AND SUPPLY CO.

BRANCH OFFICES IN PRINCIPAL CITIES — **20 North Wacker Drive, Chicago 6, Ill.**

The Joslyn Co. • The South East Joslyn Co.
Southern Joslyn Co. • Joslyn Southwest Co. • Joslyn Pacific Co.

YORK-HOOVER

IS PROUD TO ANNOUNCE

THAT 1952 IS ITS

60th Anniversary Year

Light Duty Public Utility Service Body

Heavy Duty Line Construction Body

We have attained this milestone of progress through the loyalty and confidence of our customers . . . plus strict adherence to an iron-clad policy established in 1892. That policy is to produce only quality merchandise at a fair price . . . at all times . . . and under any conceivable economic condition.

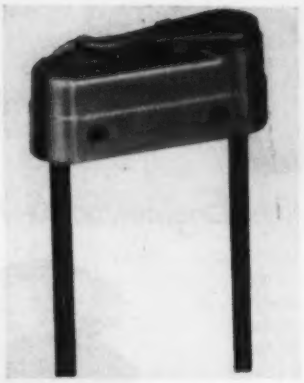
Consistent with these policies and objectives, York-Hoover has grown, in 60 years, to be a virile, progressive manufacturing organization . . . a great family of fine craftsmen . . . whose contribution to the industries we serve is reflected in the cost-saving efficiency of York-Hoover Truck Bodies wherever they are used.

We are grateful for the privilege of serving you during the past 60 years and will continue to serve you faithfully during the years to come.

1952...OUR 60TH ANNIVERSARY YEAR

YORK-HOOVER CORPORATION

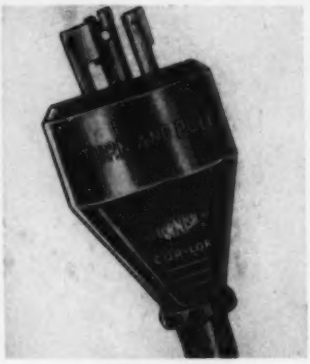
YORK, PENNSYLVANIA



precision, snap-action switches at locations that are subject to immersion in water. The waterproof leads, which are connected to the switch terminals, are potted in a high-dielectric plastic which completely seals the terminals and leads.

The switch is rated 10 amp inductive load, 25 amp resistive load, 28 v dc; 1 amp inductive or resistive load, 125 v ac.

Micro Switch, Freeport, Ill.



Locking Plug

Called the Cor-Lock, this new heavy-duty locking plug features water-proof. shock-resistant jointure achieved by molded rubber construction.

Approved by Underwriters' Laboratories for 20 amp at 250 v, and 10 amp at 575 v, it is available in a varied combination of flexible cord sizes.

A simple twist upon plugging in the plug establishes a sure connection that stays unbroken until purposely disconnected.

Cornish Wire Co, Inc, 50 Church St, New York, N. Y.

Guy transmission lines *three times stronger at half the cost* with CHANCE anchors!

You can cut line construction costs and do a *faster*, more efficient job of anchoring by using CHANCE Anchors for transmission line guying.

Here are FACTS . . . cost comparison figures on an actual installation prove that Chance Cross Plate Anchors were installed in only 2 man hours, while it took 8⅓ man hours to install a log anchor in the same terrain! The cost of materials used was approximately the same for each type of anchor and rod—but only one hole was drilled for the Chance Anchor, while a trench was necessary for the log.

Chance Anchors can withstand much greater strain for longer periods of time than treated log anchors. Laboratory tests on a Chance X-24 Cross Plate Anchor proved it capable of withstanding a pull of 70,000 lbs. for an indefinite period of time with only slight bending, while a creosoted log split under a 20,000 lb. pull in a matter of hours.

The Chance Cross-Plate can be installed in slanted or vertical machine bored holes in any kind of soil. It compares in cost with an average 4 foot treated log.

Other Chance Anchors suitable for transmission line guying are: The Never-Creep — that pulls entirely against undisturbed earth . . . The Steel Cone Anchor —ideal for rocky soil . . . and the Chance 8-way Expanding Anchor — that gives you two four-way anchors in one.

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO·

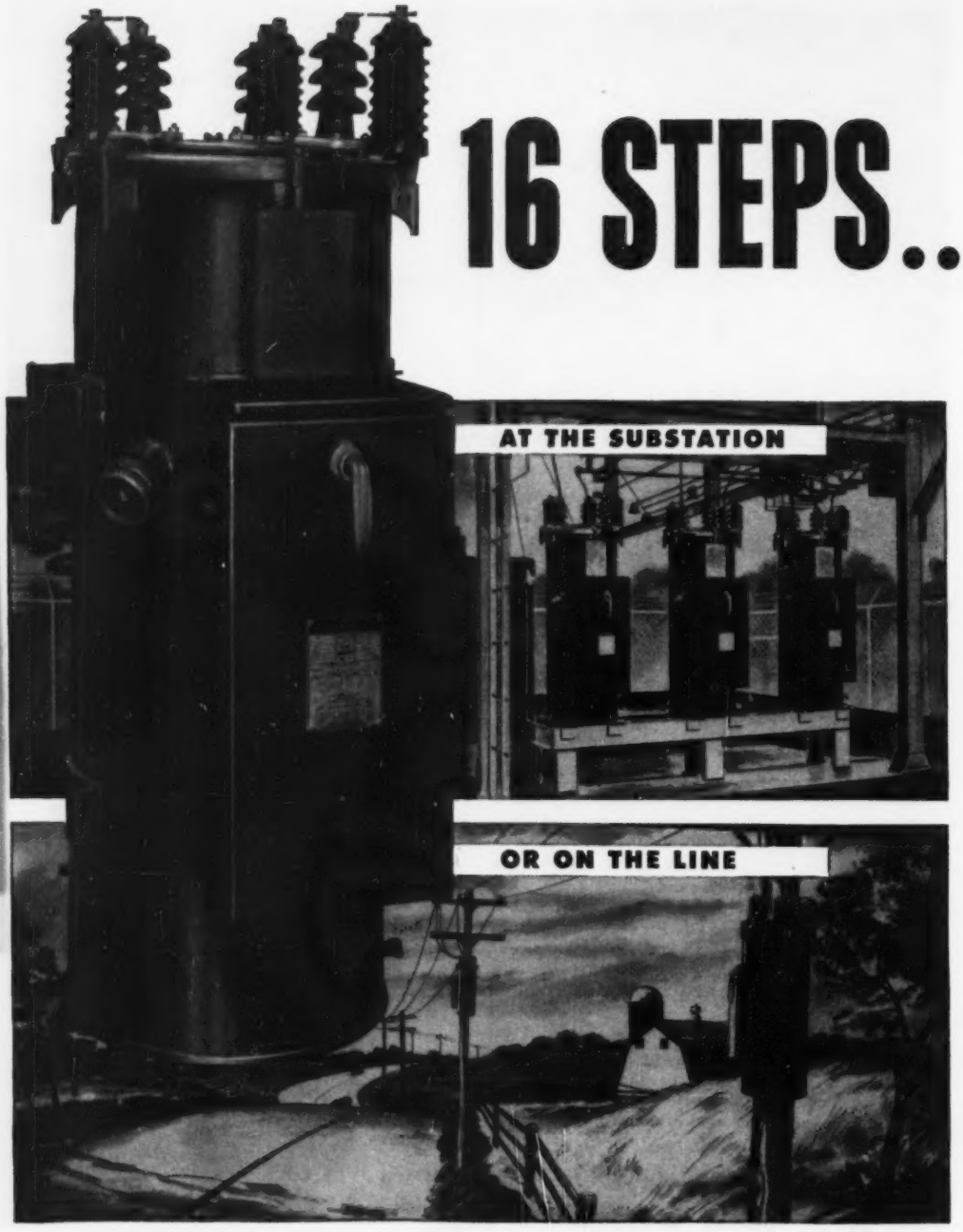
CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

ANCHORS • GUYING FIXTURES • LINE CONSTRUCTION TOOLS • CONDUCTOR CLAMPS
GROUNDING EQUIPMENT • HOT LINE TOOLS • HIGH VOLTAGE SWITCHES • CUTOUTS

FIND OUT WHY!

It's wise to use Chance Anchors instead of "dead-man" logs or slugs. Write today for test records and actual cost comparisons. We'll send you reasons why your next transmission line should be guyed the stronger, low-cost way — with CHANCE Anchors.

C52-13


16 STEPS...
AT THE SUBSTATION
OR ON THE LINE

Close Regulation, Reliable Operation ...at the *LOWEST COST!*

Check these Westinghouse Voltage Regulator advantages. Compare them. The Westinghouse URL-16 with 16, 1¼ steps provides:

★ Low maintenance cost . . . made possible with a minimum number of tap-changer operations and a minimum number of contacts and moving parts.

★ Voltage regulation within ± 1-volt band width.

Only the Westinghouse URL-16 has these features:

1. Complete surge protection with "De-ion®" arresters on each line bushing.
2. Direct Geneva Drive Mechanism has controlled contact speed for long contact life, minimum maintenance.
3. Package control in one Flexitest® unit for maximum flexibility and interchangeability.
4. Simplified control has voltage regulating relay with integral inverse time delay.

IMPROVED CONTROL CABINET . . . Control cabinet door is hinged at bottom to provide a "workbench" when in open position. Control cabinet may be mounted integrally with the regulator or on the pole below the regulator.

FOR FURTHER INFORMATION on the new URL-16 Regulator, call your Westinghouse representative, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-70614

Westinghouse URL-16 Voltage Regulator—easy to install, easy to maintain, . . . engineered for every condition of weather . . . every condition of service.

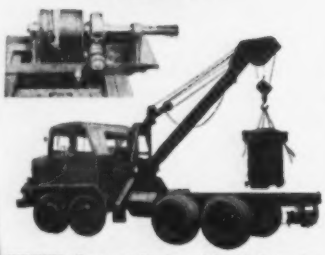
YOU CAN BE SURE.. IF IT'S

Westinghouse

VOLTAGE REGULATORS

Utilities Have Specified
SILENT HOIST Equipment
• Since 1918 •

KRANE KAR Swing Boom Mobile Crane: for materials handling . . . lifting, transporting, positioning, gasoline or Diesel, 1½, 2½, 3 and 10 ton capacities, 9 to 37 ft. booms (or telescopic booms), solid or pneumatic tires. Self-stabilizing without jacks or outriggers; unobstructed vision; fast, flexible, safe, easy to operate.



WINCHES: Capstans; Single and Double Drum, Jaw Clutch, Keyed and Friction Clutch Winches. 2,000 to 50,000 lb. Capacities.

SWING-BOOM CRANES: Truck: Motor Power Operated; high capacity; takes up only a small space. For handling transformers, cable reels, lamp posts, trees, poles, manhole castings, etc. 9 to 31 ft. booms; one to 10 ton capacities.

TOWERS: 2 or 3 section type and Pantograph types, with plain, revolving or racking platforms.

TRIPOD POLE DERRICKS for 35 ft., 45 ft., and 60 ft. Poles; single piece or telescopic side legs; removable cast steel fittings.

USERS: AT&T; N. Y. Tel. Co.; T.V.A.; Consolidated Edison Co.; W.U.; Municipalities throughout America.

WRITE FOR CATALOGS:
No. 79—KRANE KAR No. 70—Truck Equipment

THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT WHEEL DRIVE AND REAR WHEEL STEER
1½, 2, 3 AND 10 TON CAPACITIES
KRANE KAR
TRADE MARK REGISTERED
SILENT HOIST & CRANE CO.
862 63rd St. BROOKLYN 20, NEW YORK

WHAT THEY'RE SAYING

At Industry Meetings

Pure Research Needed for Scientific Advance

DR. CHARLES B. JOLLIFFE, vice president and technical director of the Radio Corp of America before the National Conference on Airborne Electronics at Dayton, Ohio.

In recent years our scientific emphasis has been heavily concentrated in applied research and engineering without similar attention being given to pure, or fundamental, research. As a consequence, we are, in a number of important areas, short of the basic knowledge that is the raw material for engineering developments.

The task of advancing the cause of pure science is even more difficult due to world conditions. The barriers of secrecy at home and abroad are serious deterrants to scientific progress. Basic to the advance of science is a free and unlimited exchange of information. In the growth of fundamental knowledge over the centuries it has often been true that the report of a scientific discovery made in one part of the world stimulated important advances along the same lines in other sections of the world. There have been no such chain reactions in numerous vital areas of science for many years. Because of this we here in America must work even harder at this pure research and study.

The U. S. Answer to Communism

L. E. OSBORNE, executive vice president in charge of defense products for the Westinghouse Electric Corp, before that company's Metals Joining Committee at East Springfield, Mass.

America's answer to Communism is the world's highest standard of living which has brought with it an equality that would amaze many of the framers of the Constitution. Electricity in the factory has literally created a new life for the wage earner by providing more power and tools. More power has eliminated many of the extremely fatiguing jobs which were commonplace in the early 1900's and the productivity increase has resulted in far higher real wages.

The electric industry, which is growing at a rate of three times faster than any other industry, is playing a dual role in the national defense program. One job is to provide specialized equipment for the Armed Forces and the other to manufacture electric power equipment essential to the operation of American industry.

New Electronic Developments

BRIG GENERAL DAVID SARNOFF, chairman of the board, Radio Corp of America before the 33rd Annual RCA stockholders meeting at New York City, N. Y.

Many new radio-electronic improvements are being developed which hold great promise for new business in the future. RCA scientists and engineers are presently developing nine new products for business, industry, and communications.

A Color Corrector, which reduces by at least 50% the time required to make color plates for printing, electronic inspection apparatus for safeguarding the purity of drug products in medical ampules, portable one-man television stations called "Walkie-Lookie" for on-the-spot news coverage, and international television are but a few of the new developments that are now being worked on in the laboratories.

Today, our foremost responsibility is to serve the nation by providing the Armed Forces with radio, television, and electronic apparatus vital to the success of their operations.

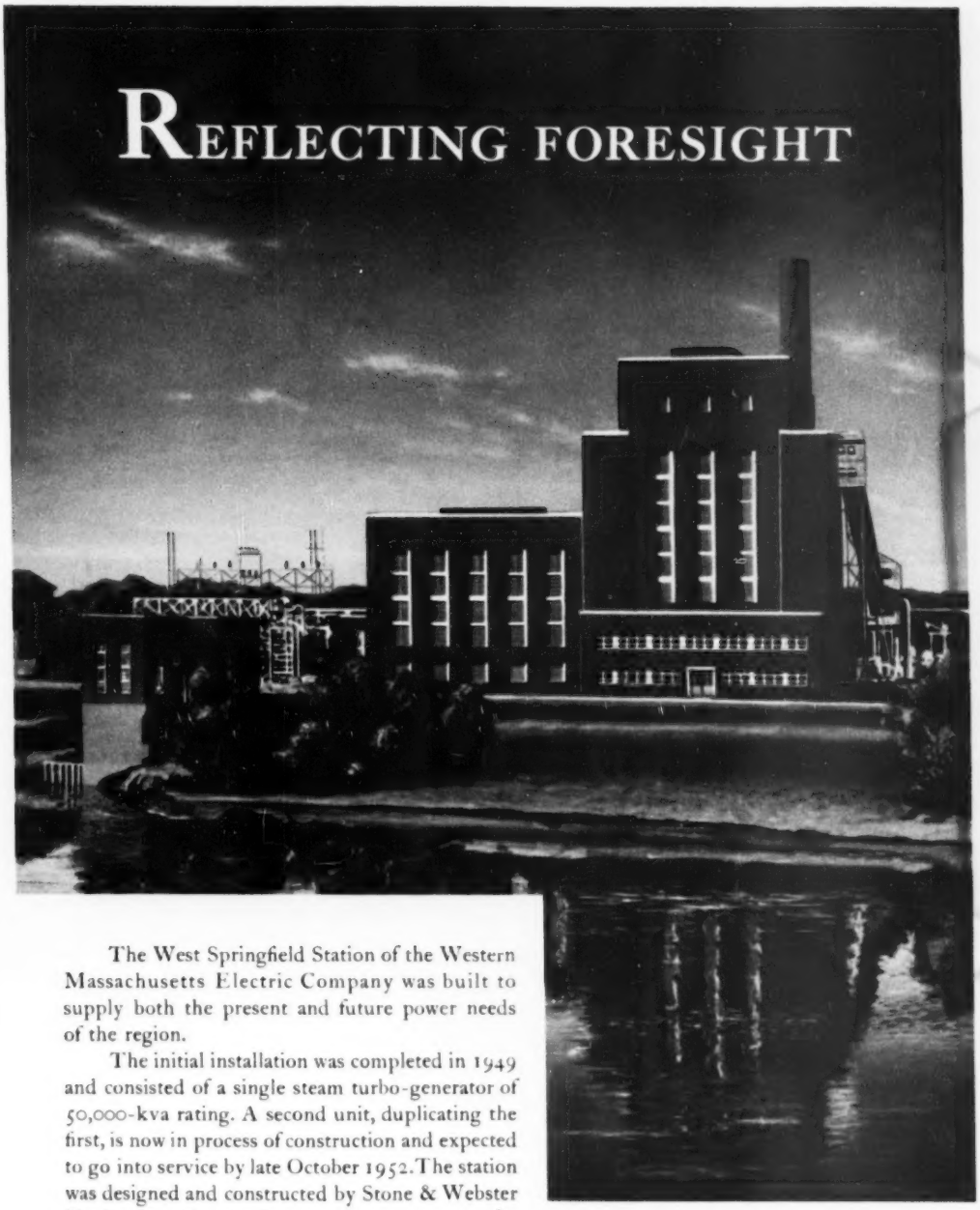
Engineers and Public Affairs

GLENN B. WARREN, general manager, General Electric Company's Turbine Div before the Fourth Annual Engineer's Day dinner of the Univ of Wisconsin at Madison.

During these critical times there is an ever increasing need for professional engineers to take an active participation in public affairs. I believe we need the practical, informed and intellectually honest approach to public affairs that the engineer has brought to our private industrial affairs.

Engineers as citizens should insist that government participation in business be strictly limited to those functions which government can and should be able to perform better than private groups. Because of this important issue and many others the engineer has both a right and an obligation to participate in public life.

REFLECTING FORESIGHT

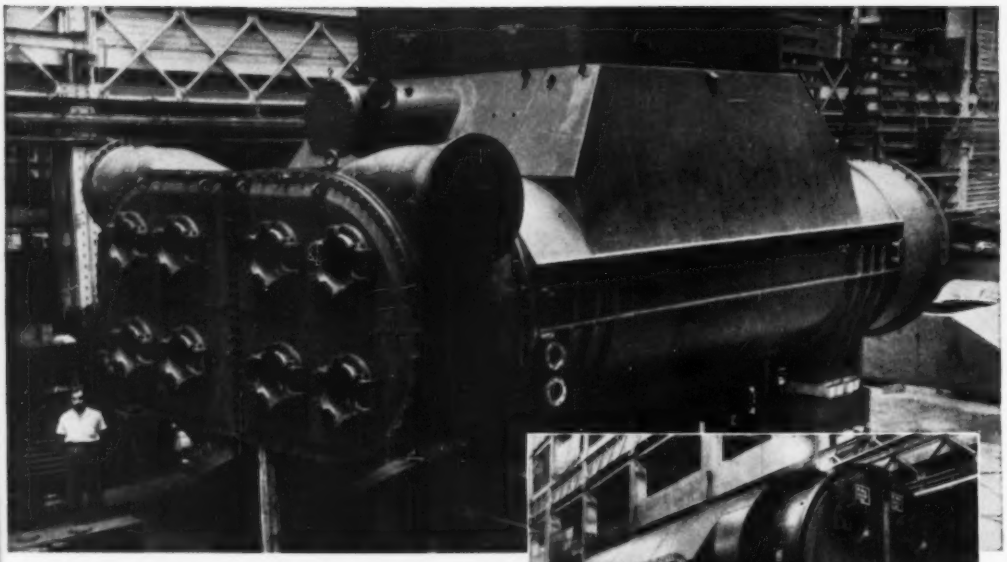


The West Springfield Station of the Western Massachusetts Electric Company was built to supply both the present and future power needs of the region.

The initial installation was completed in 1949 and consisted of a single steam turbo-generator of 50,000-kva rating. A second unit, duplicating the first, is now in process of construction and expected to go into service by late October 1952. The station was designed and constructed by Stone & Webster Engineering Corporation.

STONE & WEBSTER ENGINEERING CORPORATION

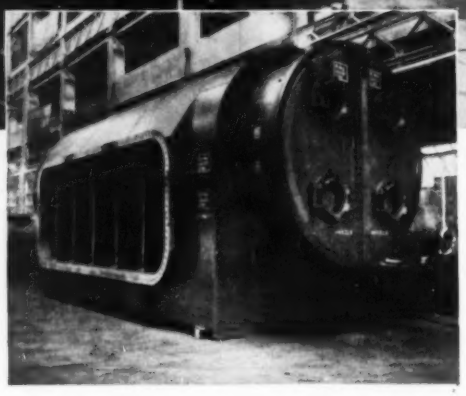
A SUBSIDIARY *of* STONE & WEBSTER, INC.



LOW-HEADROOM, OVAL-TYPE CONDENSER (with extraction heater in exhaust neck), is typical of several furnished in sizes ranging from 27,500 to 80,000 sq. ft.

"TAILORED TO FIT"

Low-headroom design for condensers typical of Worthington "space" engineering



SIDE INLET CONDENSER, one-half of several "twin shell" units serving turbine-generators of 20,000 to 100,000 kw.

It all began in 1854.

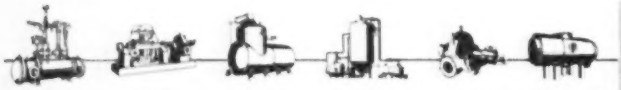
That was the year the first Worthington condenser was installed. From that time, up through the early twentieth-century "evolutionary" period in condenser design, Worthington has constantly kept in step with prime mover and steam power plant development. Today, engineers must design and build condensers within the limitations imposed by high construction costs.

Thanks to the flexible nature of the Worthington "Double Folded Tube Layer", today's "low-headroom" requirements are easily met without any sacrifice in efficiency. For single-shell, beneath-turbine installations, the rectangular box-type (built by Worthington as early as 1904) has given way to the modern "oval" design illustrated above. Other designs include single-shell, side-mounted units with exhaust elbows, and twin shells with horizontal or "T" shaped exhaust connections, popular for outdoor or semi-outdoor plants.

As the capacity of turbine-generators increases, so does the demand for larger condensers. This places more importance on "space" engineering. Worthington—with over a century of experience in the manufacture of steam power equipment—is prepared to build efficient condensers in all sizes to suit any reasonable limitations. (Now under construction for an eastern utility is the largest single-shell unit ever ordered—125,000 sq. ft.)

Write for advice on your new installation, stating requirements. Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Steam Power Division, Harrison, N. J.

Z.2.1



A GREAT TEAM IN STEAM

WORTHINGTON

Condensers

NEWS ABOUT PEOPLE

M. F. MURPHY

R. F. CREUTZ

Murphy, Creutz Made VPs . . .

. . . by Commonwealth Edison and its subsidiary, PS of Northern Illinois, respectively. Ayers and Leister elevated

New executive appointments have been made by Commonwealth Edison Co and its subsidiary, Public Service Co of Northern Illinois.

New Officials . . . Morgan F. Murphy, vice president of Public Service, has been elected a vice president of Commonwealth Edison.

Robert F. Creutz, a vice president of Commonwealth Edison, has been made a vice president of Public Service, succeeding Harold S. Patton who has resigned. Patton, however, will be available in an advisory capacity.

Thomas A. Ayers has been appointed assistant vice president reporting to Creutz and also has been made assistant vice president of Commonwealth Edison. Ayers will have charge of the industrial relations departments of both Commonwealth Edison and Public Service.

Heads Industrial Relations . . . Volney B. Leister, a staff assistant in the industrial relations department of Public Service for the past year, has been appointed director of industrial relations of the utility.

Murphy began his utility career with Public Service in 1925 as a stenographer. In 1935 he was named secretary to the president and in 1943 was made assistant to the president. He assumed the vice president's post in 1947.

Started in 1937 . . . Creutz joined Commonwealth Edison in 1937 as federal tax supervisor in charge of federal tax activities. In 1945 he was made assistant comptroller and three years later was named vice president in charge of industrial relations.

Ayers, who started with Public Service in 1937, has been manager of industrial relations for the utility for the past four years. Leister, who began with Public Service in 1929, served in the company's Northbrook headquarters for 16 years prior to his promotion as staff assistant in the industrial relations department.

Patton, who came to Public Service in 1915, was made vice president of the utility in 1947.

•

Robert S. Bromage has been appointed rate engineer of the Connecticut Light & Power Co at Berlin headquarters. He succeeds **Robert M. Keeney** who has retired. Bromage, who joined the company in 1936, was named assistant rate engineer in 1948. Keeney started with the utility in 1925 after working with Westinghouse Electric Co.

Frank Brower and **Otto W. Manz, Jr,** have been made assistant vice presidents of Consolidated Edison Co of New York, Inc. Brower, who joined New York Edison Co, a predecessor company, in 1920, was appointed system engineer in 1940, heading the planning and development activities of the company. Manz, who became associated with the company in 1925 when he joined Brooklyn Edison, was appointed manager of system operation in 1950.

Ivan L. Bateman has been appointed assistant chief electrical engineer of Los Angeles City Department of Water and Power. In his new position he will be responsible for operation and coordination of the Operating and General Plant Divisions, reporting to chief electrical engineer William S. Peterson. Bateman has been head of the Department's Power System Operating and Maintenance Division since 1929.

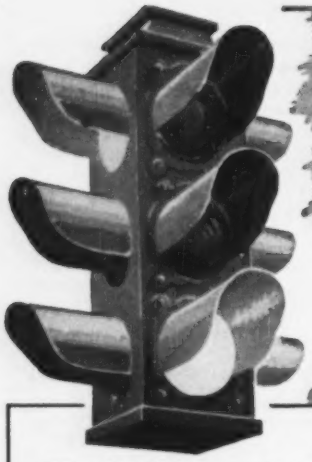
A. B. Green, Jr, formerly in charge of special construction work for Georgia Power Co at Atlanta, has been named assistant superintendent of the utility's production department, a post which includes operation and construction of all power plants. Green's successor is **W. E. Bradley,** supervisor of line and substation construction.

G. L. ANDRUS

G. L. Andrus Is Elected a VP of New Orleans PS

Gerald L. Andrus has been elected a vice president of New Orleans Public Service, Inc.

Andrus, who has been serving the utility as comptroller since 1947, joined Public Service in 1928 and served in the auditing and insurance departments until 1934. At this time

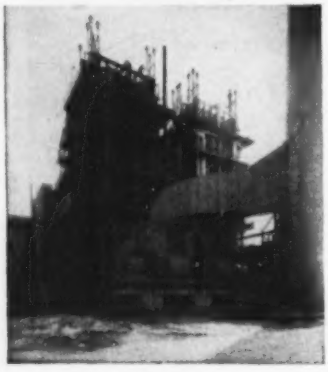


DRAFT FANS GO on GREEN

GREEN FANS . . . Used by Many Leading Utilities

One significant fact about Green Fan Installations at the New Orleans Public Service Plant is that two different boiler manufacturers were involved . . . two different types of boilers but Green Draft Fans for all three boilers. Each boiler has two Green Induced Draft Fans and one Green Forced Draft Fan.

When a concern has specialized on an important piece of power plant equipment for many years, that firm is rightly called the "authority" on the subject. This is the position of Green Fuel Economizer Co. in the field of mechanical draft fans. The name Green is synonymous with Draft Fans highly acceptable to industry.



The Line of Green Induced and Forced Draft Fans includes many types in many sizes which are described in Bulletin No. 168. We shall be glad to discuss your fan requirements with your own engineers, with your consulting engineers and with the boiler manufacturer of your choice.

THE GREEN *Fuel Economizer* COMPANY INC.

BEACON 3, NEW YORK

ECONOMIZERS • FANS • AIR HEATERS • CINDERTRAPS

he was first named an officer of the company, becoming assistant secretary and assistant treasurer. He was assistant to the vice president from 1945 until he assumed the position of comptroller.

A native of Crowley, La., Andrus attended Tulane University's College of Business Administration, from which he was graduated in 1928. Besides being president of Tulane Alumni Association, he is also a member of the Society of Louisiana Certified Public Accountants.

F. J. KOVALCIK

Kovalcik Is Appointed Western Editor of EW

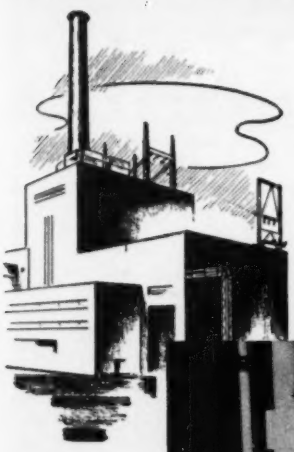
Francis J. Kovalcik, assistant editor of Electrical World since January 1949, has been made western editor. Kovalcik, who will make his headquarters at EW's San Francisco office, succeeds Joseph A. Robinson, who resigned June 1 to become sales manager and assistant to the president of Viber Co, Burbank, Calif.

Kovalcik, who graduated from Purdue University in 1948 with a bachelor of science degree in electrical engineering, joined EW in August 1948. From July through August of that year he was employed by Carnegie-Illinois Steel Corp at Chicago. During World War II he served with the Navy.

Robinson, who started with McGraw-Hill Publishing Co at San Francisco in 1947, has been serving as western editor of EW since 1951.

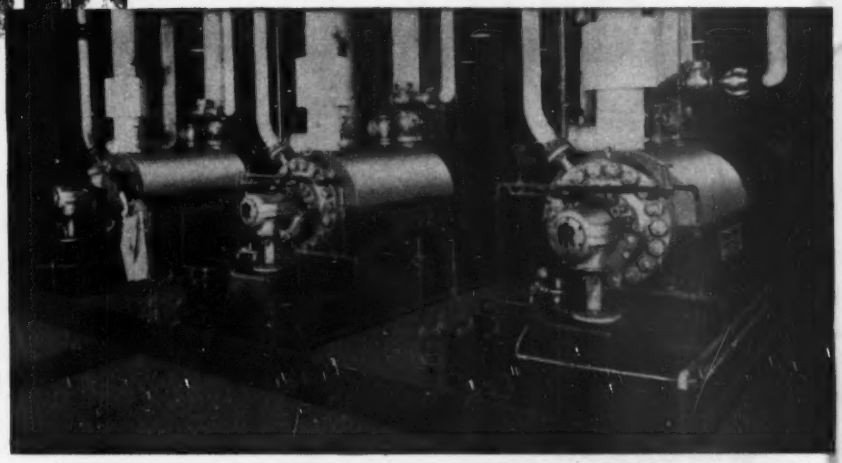
Matt W. Stanley has been named assistant treasurer of Aluminum Co of America. Now secretary of New

NEW TANNERS CREEK PLANT



USES I-R HIGH-PRESSURE BOILER FEED PUMPS

Indiana & Michigan Electric Company's newest steam plant represents the most advanced ideas in the economical production of power from coal.



Three Ingersoll-Rand 5CHTA, 11-stage boiler feed pumps at new Tanners Creek Plant. Each unit rated 1,100 gpm, 63 psi suction, 2458 psi discharge, 304°F, 3570 rpm.

The three Ingersoll-Rand Class CHTA pumps shown above serve the new 150,000 kw generator unit at Indiana & Michigan Electric Company's Tanners Creek Plant—tenth major power plant of the vast American Gas & Electric System.

All equipment at this station was selected on the basis of high and lasting overall economy. As a result Tanners Creek is one of the most efficient power plants ever constructed—with a btu per kwhr ratio at least one-third better than the national average. This new plant, situated on the Ohio River near Lawrenceburg, Indiana, was designed by the American Gas & Electric Service Corporation. A second 150,000 kw unit is scheduled for service in September 1952—part of A G & E's expansion program that will bring the total capability to 3,739,000 kw at the end of 1953.

Here—as in leading power plants from coast to coast—I-R equipment is doing an outstanding job. Your nearest Ingersoll-Rand representative will be glad to give you complete information on Class CHTA pumps, or any other I-R power plant equipment.

Instrument air for Tanners Creek is supplied by the 12" x 11" I-R Class ES compressor shown above. Two I-R Class XRB 2-stage compressors provide general service air for the generating station's uses.

Ingersoll-Rand

Cameron Pump Division 704-10
11 Broadway, New York 4, N. Y.

PUMPS · COMPRESSORS · CONDENSERS · ROCK DRILLS · AIR AND ELECTRIC TOOLS · DIESEL AND GAS ENGINES · VACUUM EQUIPMENT

"PULL"

THAT PULLS DOWN COSTS

GarWood

TRUCK WINCHES

They're tougher . . . last longer . . . pull more and faster . . . safer to operate . . . require less maintenance . . . are always ready in emergency. Gar Wood Winches have the "pull" to get more work done, and pull down costs. Many exclusive features of construction make them the winches preferred by Utilities throughout the country. Write for Bulletin.

GarWood

TRUCK CRANES

Can't be beat for safe, fast, low-cost handling of conduit, poles, transformers, tree-trunks, switchgear, and all the other loads you need to lift. Built to take minimum space behind cab, leaving body unobstructed for maximum pay load. Sizes from 2,000 to 24,000 lb. Write for Bulletin WC-202.

52-12

GAR WOOD GW INDUSTRIES

GAR WOOD INDUSTRIES, INC.

Wayne Division • EXECUTIVE OFFICES, WAYNE, MICHIGAN

TRUCK EQUIPMENT: Dump Truck Bodies & Hoists, Winches & Cranes, Refuse Collection Bodies, Elevating End-Gates. CONSTRUCTION EQUIPMENT: Excavators, Scrapers, Dozers, Ditchers, Spreaders, Finegraders, Truck-Mounted Road Graders.

Method Finance Corp, an Alcoa subsidiary at New Kensington, Pa., Stanley will act as general assistant to the Alcoa vice president and treasurer. He started his career with the aluminum firm in 1937.

George C. Macdonald has been appointed sales promotion manager of Brown Co, Boston, and Brown Corp, a newly created department in coordination with Brown's advertising division. Macdonald, who joined Brown in 1928, was made manager of the Southwestern territory with headquarters in Dallas in 1938.

P. R. Mallory Names Frank Powers a VP

Frank B. Powers has been elected vice president in charge of manufacturing for P. R. Mallory & Co, Inc, Indianapolis, Ind.

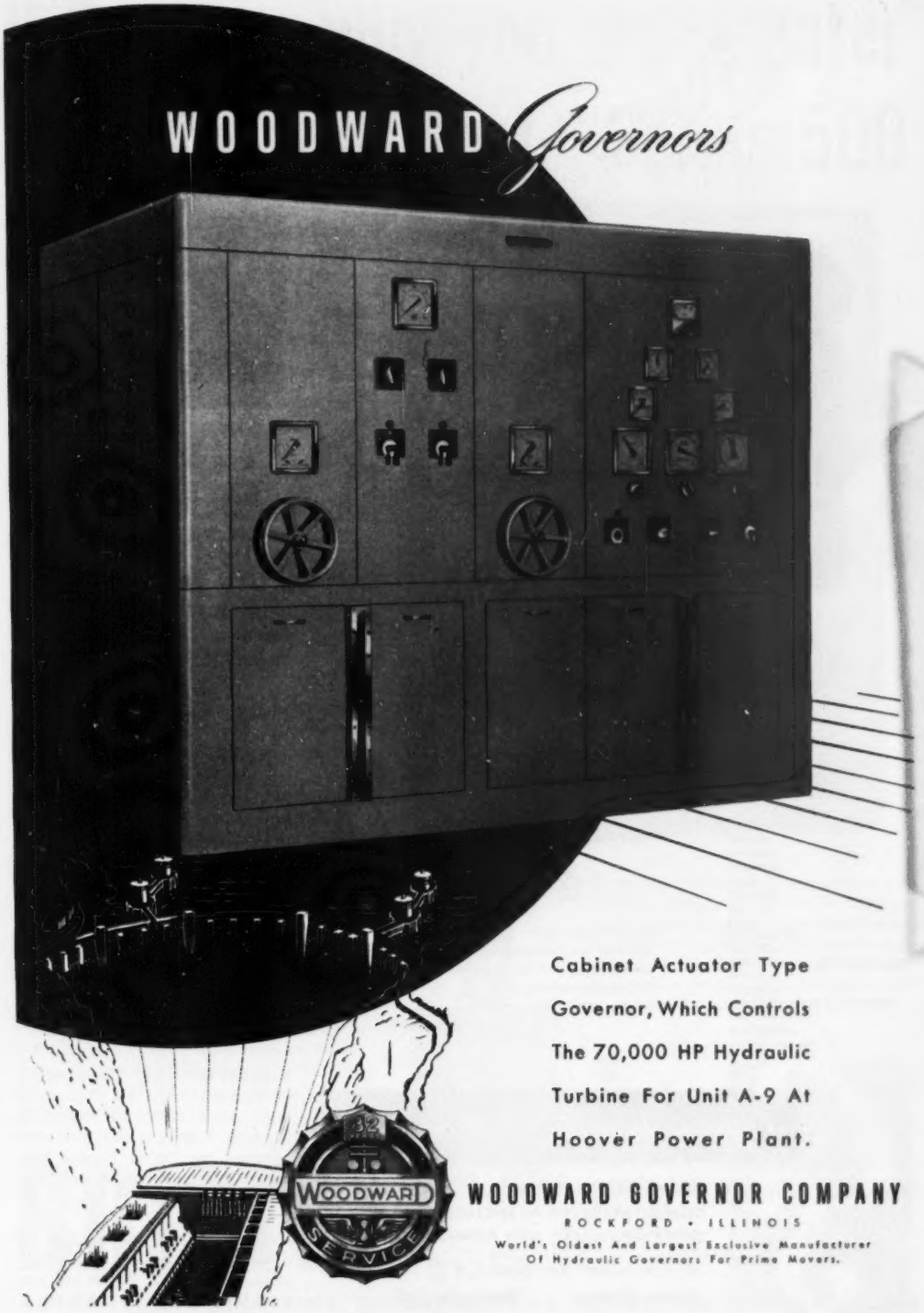
Powers came to Mallory from Federal Telephone & Radio Corp, where he was a vice president in charge of operations and a member of the board of directors. While at Federal Telephone & Radio, he also served as vice president and director of the firm's affiliate, Federal Electric Corp.

After graduating from the University of Illinois, Powers was employed by Westinghouse Electric Corp, where he remained for 20 years. Later he was associated with Baldwin-Lima-Hamilton Corp and American Car & Foundry Co.

Edward J. Good has been appointed manager of electric sales for Louisville (Ky.) Gas & Electric Co. He succeeds E. V. Freeman, who was killed recently in an automobile accident (EW, June 2, p 141). Good, who started with Louisville G&E more than 25 years ago, has worked in all phases of electric and gas sales.

C. W. Burningham, an engineer with 30 years' service for the Bureau of Reclamation, has joined the project planning and engineering division in the bureau's Region II office in Sacramento, Calif. Burningham recently returned from Saudi Arabia where he was on loan to conduct an investigation of land and water resources. He was transferred to Sacramento from Klamath Falls, Ore., where he was chief of planning for the Klamath Project area.

WOODWARD *Governors*

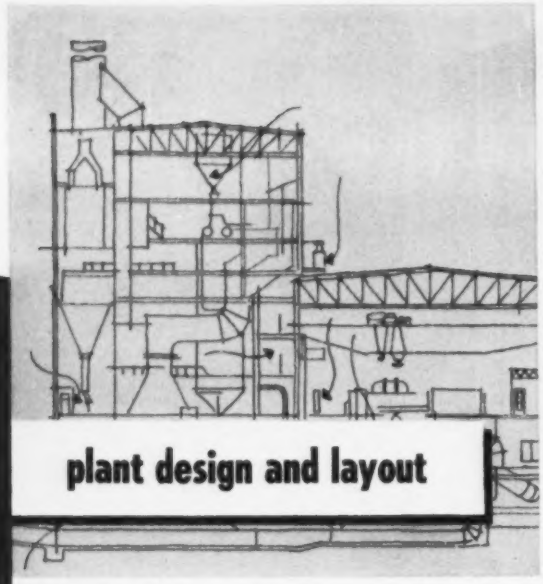


Cabinet Actuator Type Governor, Which Controls The 70,000 HP Hydraulic Turbine For Unit A-9 At Hoover Power Plant.

WOODWARD GOVERNOR COMPANY

ROCKFORD • ILLINOIS

World's Oldest And Largest Exclusive Manufacturer Of Hydraulic Governors For Prime Movers.



plant design and layout

Plans—drawings and specifications
—are cold and impersonal,
although they are efficient steps
toward an end result.
They are more than that when they
represent the best thinking
of men who have pride in seeing
their efforts take shape in structure
and equipment
that produce the required results.

INVESTIGATIONS
REPORTS
FINANCING
ACCOUNTING
TAXES
INSURANCE
PENSIONS
RATES
DEPRECIATION
VALUATIONS
CONSULTING & DESIGN ENGINEERING
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We invite your inquiry . . .
Write for our illustrated booklet describing our consulting and design engineering services.
Address: Department A
20 Pine Street, New York 5, N. Y.

Commonwealth Services Inc.
and subsidiaries
COMMONWEALTH ASSOCIATES INC.
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20 Pine Street, New York 5, N.Y.
Jackson, Michigan *Washington, D.C.*

OBITUARY

C. K. KING

C. K. King

Charles K. King, 85, formerly president and a chairman of the board of Ohio Brass Co, Mansfield, Ohio, died May 31 at Edgartown, Mass.

King started with Ohio Brass in 1893 as an electrical engineer and sales manager. Later he served successively as secretary and vice president. In 1928 he was made president and general manager. He served in this capacity until 1946 when he was elected chairman of the board, a post he held at the time of his death.

Prior to joining Ohio Brass, King was with Northwest Thompson Houston Co, and Ansonia Electric Co.

King was a member of the National Electrical Manufacturers Association and, in 1943, he received an award from NEMA for 50 years' service to the electrical industry.

Thomas B. Griffith, 56, treasurer of Central Illinois Light Co, died May 23 at Versailles, Mo., while en route to Texas on a vacation. Griffith, who started with the utility in 1915, was elected treasurer in 1944.

Robert E. Howard, Jr, 52, comptroller of Alabama Power Co, died in his hotel room in New York June 5. He had been stopping in New York after attending the Edison Electric Institute's 20th annual convention at Cleveland, Ohio.

Doyle O. Reaves, 43, manager of Arkansas Power & Light Co's Newark office, died May 22. Reaves had been with Arkansas P&L for five years.

6 Reasons why you get greater accuracy with Bristol Series 500

RECORDING VOLTMETERS AND AMMETERS

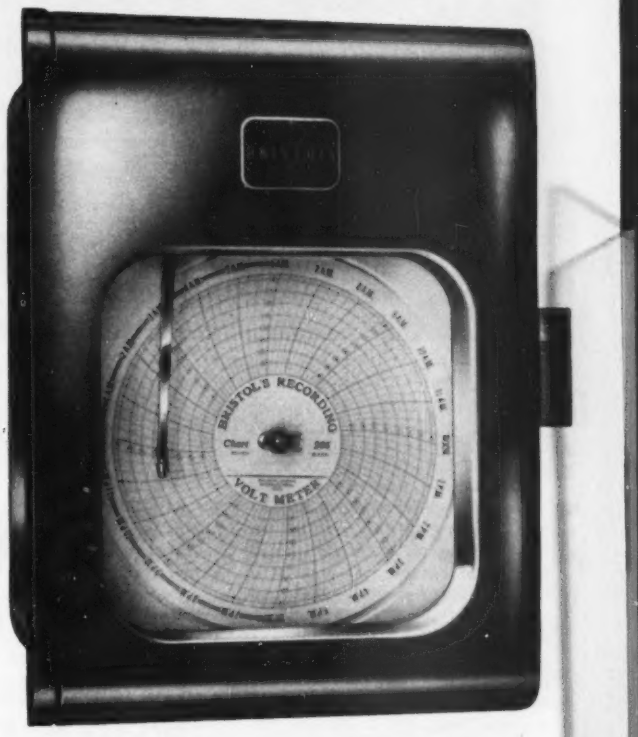
1. Low burden—the lowest burden of any round-chart recorder on the market.
2. Extremely high torque gradient.
3. Temperature compensated.
4. Shock-proof moving element mounting.
5. Leveling of instrument not critical.
6. Continuously legible recording on sudden changes—up to full scale value.

Bristol Recording Voltmeters and Ammeters use moving-iron measuring mechanisms, known for high torque . . . refined by Bristol engineers for greater accuracy and ruggedness.

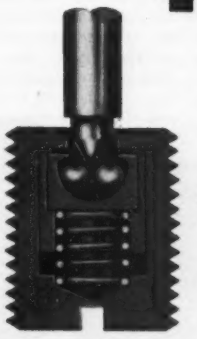
Advances in electrical measurement naturally come from Bristol, experienced for nearly 60 years in building hundreds of thousands of recording voltmeters and ammeters for almost every application . . . the finest, most dependable products.

Series 500 Voltmeters and Ammeters are designed for easy use, with dust- and moisture-proof die-cast aluminum case; quick-set chart hub for easy chart changing; non-obscuring pen lifter; and snap-on chart plate.

Find out all about these superior instruments by writing for Bulletin E1111 to THE BRISTOL COMPANY, (116) Bristol Road, Waterbury 20, Conn.



Permanent mounting offered in three models: interchangeable surface and flush, surface-panel and flush panel. Note the pleasing, well-balanced appearance. Also, *portable instruments* are offered in two models: for setting on floor or table; for mounting on walls or poles and general service.

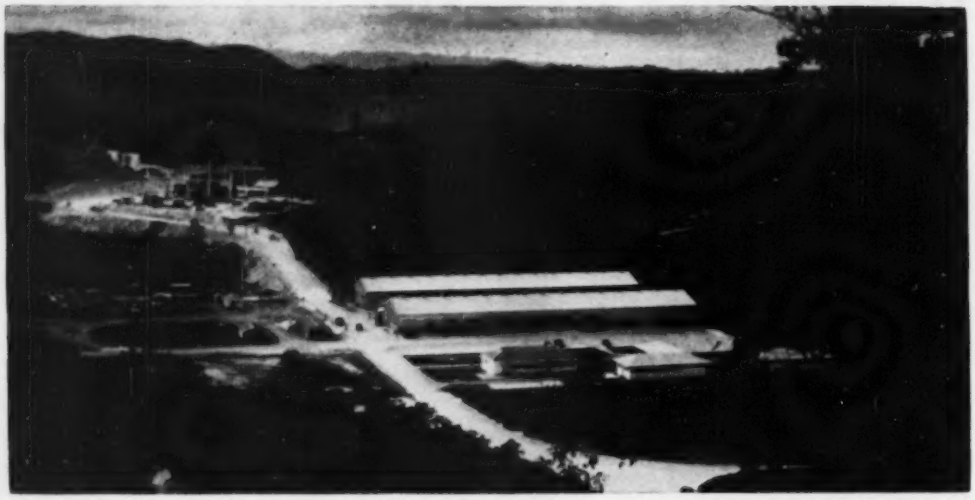


New ball-bearing suspension, loaded by a coil spring, prevents damage even under severe mechanical shock. Stainless steel bearings and shaft are almost tool hard and are corrosion-resistant.

BRISTOL

The dependable Guidepost of Industry

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



NESTLED in the sloping hills of St. Ann District, Jamaica, B.W.I., is the processing center of Reynolds Metals Co's subsidiary, Reynolds Jamaica Mines, Ltd. Here the bauxite is pellitized. The $17-million project is supplied with power from the diesel plant (left)

Reynolds Metals' New Frontier

Jamaica—the land of rum, sugar, and tourists—is where Reynolds Metals Co has found a new frontier. This frontier possesses the world's largest reserves of bauxite, raw material of aluminum, totaling 320 million tons.

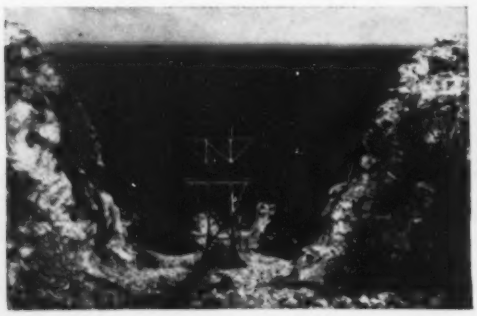
First Shipment . . . The first commercial shipment of the material was made recently by the company's wholly owned subsidiary, Reynolds Jamaica Mines, Ltd, to Mobile, Ala., for use at Reynolds Metals' Hurricane Creek (Ark.) plant. Behind the shipment is a big story.

This Carribbean tale really began in 1942 when Sir Alfred H. D'Costa, a wealthy Jamaican who found an area of his land was not conducive for agricultural cultivation, sent a soil sample for analysis to R. F. Innis, then Jamaica government soil chemist. The sample revealed bauxite.

Obtains Loan . . . Although the discovery was not regarded too highly by British and Canadian aluminum companies, Reynolds was interested in a close source of supply. After World War II, when Marshall Plan funds became available to develop foreign sources of strategic minerals, the American firm obtained an Economic Cooperation Administration loan of $11 million. With the pioneering spirit of the "covered wagon days," Reynolds Metals set out to develop this new frontier.

Reynolds, after completing a negotiation for some 50,000 acres, then built a processing plant in the St. Ann District of the British West Indies island. It also constructed a power plant, a six-mile overhead bucket conveyor system, and a 500-ft L-shaped pier inside the reef-protected harbor at Ocho Rios.

Bauxite Operations . . . The first step in the bauxite operations takes place with the surface mining. The raw material is scooped up from the earth by large earth moving equipment and transported by dump trucks and un-



TOWER is part of 6-mile aerial tramway that takes ore to the sea

ORE is stored in silos (left). The tank (right) contains crude oil

Thompson Chemicals

FIRST NAME IN BRUSH KILLERS

EXTRA CREEP for EXTRA KILL with

LOW VOLATILE BRAMBLE-WEEDICIDE

Bramble-Weedicide contains H-31, the Thompson patented creeping agent because field tests prove it definitely steps up killing effect.

Woody growth control is also intensified by the use of low volatile pentyl esters. The molecular structures are absorption-rated to assure greatest herbicidal effect. For these reasons, Bramble-Weedicide is more effective and economical than older chemical controls.. first choice of more and more utilities.

Whether you spray by truck, tractor, knapsack, plane or basal bark . . . specify Bramble-Weedicide.

Thompson manufactures many types of brush and weed killers. Write for helpful information on specific problems.

WHEN TO SPRAY BRAMBLCIDE

BRAMBLCIDE is the Thompson low volatile pentyl esters of 2, 4, 5-T fortified with H-31 for extra killing surface creep. BRAMBLCIDE is used for controlling mesquite, huisache, McCartney's rose, osage orange, prickly pear, oak, post, and black jack either by foliage spray or basal stem. Some utilities report that despite a slightly higher cost, (a smaller quantity is needed) it is the preferred herbicide for basal bark or stump treatment.

Thompson Chemicals

other superior

WEED & BRUSH KILLERS

- **WEEDICIDES:** 2,4-D Esters and Amines
- **BRAMBLCIDE** 2,4,5-T Low Volatile Ester
- **PHYTOCIDE** } General Weed Killers
- **PENTA-WEEDICIDE** }

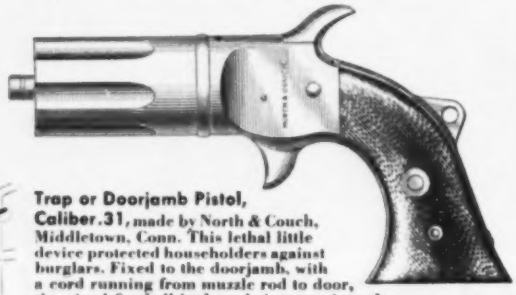
Send for helpful booklet:
HOW TO CLEAR RIGHTS-OF-WAY

Thompson **CHEMICALS CORP.**

St. Louis 3, Missouri
Los Angeles 27, California

Famous Guns

Deringer Percussion Pistol, Model 1843, product of Henry Deringer of Philadelphia. Deringer's large caliber, short barreled pocket pistols were so popular that others imitated them—calling them "derringers". John Wilkes Booth used a Deringer to assassinate Lincoln.



Trap or Doorjamb Pistol, Caliber .31, made by North & Couch, Middletown, Conn. This lethal little device protected householders against burglars. Fixed to the doorjamb, with a cord running from muzzle rod to door, the pistol fired all its barrels into any intruder.

Weller Instant-heating Soldering Gun for light or heavy work. Dual heat greatly increases tip life. Switch instantly to high or low heat as job requires. Pre-focused spotlights end "blind soldering". Exclusive tip-fastening arrangement assures full, constant heat. High-impact plastic housing. Perfect balance. Low-cost replaceable tips. Pays for itself in a few months. See at your Distributor or write for Bulletin direct.

Get SOLDERING TIPS, new Weller Handy Guide to faster, easier soldering. 20 pages fully illustrated. Price 10c at your Distributor or order direct.

Weller BETTER FROM GRIP TO TIP!

SOLDERING GUNS 817 Packer Street, Easton, Pa.

The Finest Soldering Tool for the Finest Craftsmen

loaded at a ground-level hopper, where a conveyor belt carries the freshly mined bauxite to the processing center. Here ore is dried in large kilns and pellitized to simplify further transportation.

After processing, the bauxite is loaded into buckets, which have covers to prevent dust clouds while enroute via the aerial tramway six miles to the sea. There bauxite is dumped into huge silos and stored until ready for overseas shipment. Each silo holds a shipload capacity of 12,000 tonnage.

When ready to be shipped, the bauxite travels on an underground conveyor from the silos to the pier, where it is unloaded in the hold of the ship.

Carrier Ordered . . . To handle future shipments, Reynolds Metals has ordered a 13,000-ton self-unloading ore carrier. The carrier, which is expected to be fully loaded in less than half a day each trip, is to be completed by August. On its return from the United States to Jamaica, it will carry crude oil as ballast. Upon arrival at Jamaica the crude oil will be pumped into the storage tank at the pier and by pipeline it will then be carried to the processing center to supply fuel for the diesel power plant. The power plant has three 525-kw units and one 850-kw unit.

First year's mining may net 750,000 tons of bauxite. A rough estimate —with four tons of bauxite to make one ton of aluminum—shows this figure amounts to 200,000 tons of aluminum. Reyonlds, which produced about 248,000 tons of aluminum last year, is aiming at a production rate of 415,000 tons for '53. Reynolds may use about 1,600,000 tons of bauxite a year.

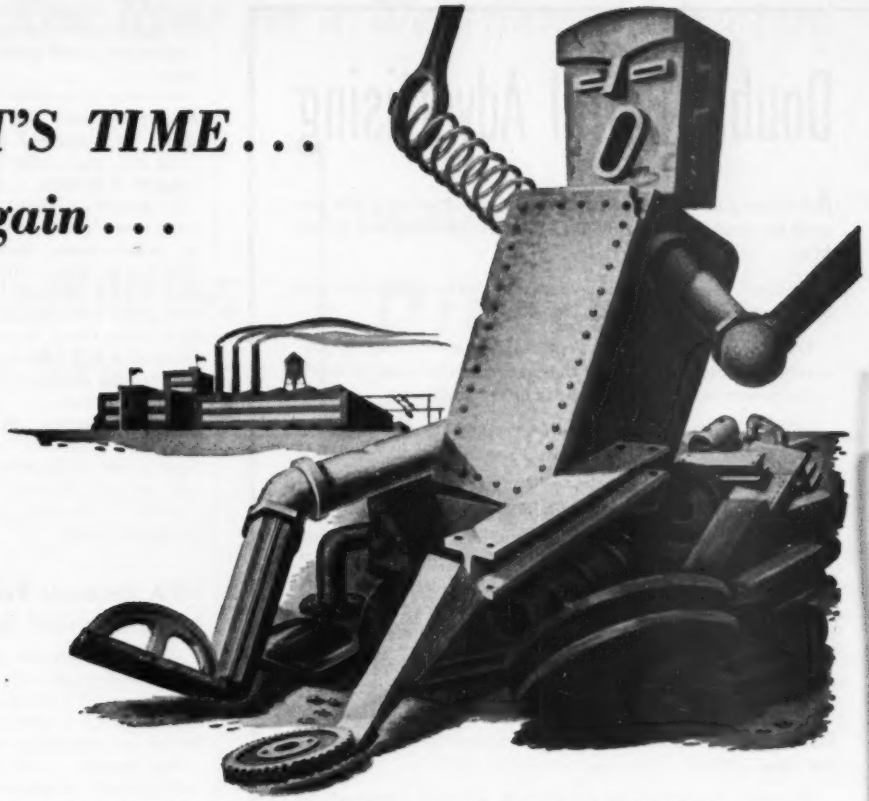
Under the supervision of Bill Cole, Reynolds' resident manager, about 500 Jamaicans, trained by Reynolds, help with the bauxite operations.

Point Four Project . . . Because Reynolds has started its own Point Four Project these Jamaicans enjoy a new prosperity. Since only a portion of its acreage will be used for mining, Reynolds has leased plots of land—free of charge—to Jamaican families and has helped them learn modern farming techniques.

Reynolds has also gone in for cattle raising. To improve the breeds Reynolds acquired as a result of farms and grazing lands purchased, the company imported Brahman cattle from

IT'S TIME . . .

again . . .



TO WAKE UP SCRAPPY!

Scrap's getting scarce again . . . compared to the amounts we need . . . and it's up to *all* of us to *help* produce enough steel.

107,000,000 tons of steel is the present rate of production in 1951 . . . 119,500,000 tons is expected in 1952.

Last year, 1950, we produced 97,800,000 tons.

All that extra steel—enough to take care of *both* military and civilian needs—calls for *more scrap iron and steel.*

Scrap Inventories Are Alarmingly Low

While steel mills are producing at a greater rate than ever, scrap inventories have dwindled. Many mills are operating on a hand-to-mouth basis with shut-downs threatened unless we furnish more scrap.

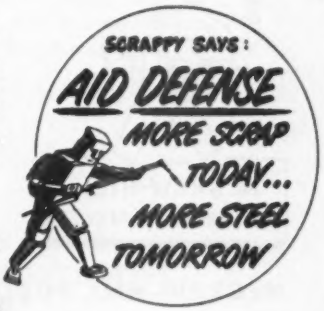
We *do* have the scrap. It's everywhere, not just in the form of *production* scrap—the "leavings" of machining, normally turned over to scrap dealers . . . but also in the form of *idle* metal: obsolete machines and tools, no-longer-usable jigs and fixtures, gears, chains, pulleys, valves, pipe, abandoned steel structures, etc.

We must have this *idle* metal to keep the furnaces running.

Please cooperate. Set up a Scrap Salvage Program in your plant—*now.* For a complete plan on "how to do it", write for booklet "Top Management: Your Program for Emergency Scrap Recovery". Address Advertising Council, 25 W. 45 Street, New York 19, N. Y.

Why Do We Need *Scrap?*

Steel is made half from pig iron, half from scrap. With production on the increase, more scrap must be purchased. And it's up to you to "dig it out" and sell it.



NON-FERROUS SCRAP IS NEEDED, TOO!

This advertisement is a contribution, in the national interest, by

McGRAW-HILL PUBLISHING COMPANY, INC.

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Double Barrel Advertising

Advertising men agree—to do a complete advertising job you need the double effect of both Display Advertising and Direct Mail.

Display Advertising keeps your name before the public and builds prestige.

Direct Mail supplements your display advertising. It pinpoints your message right to the executive you want to reach — the person who buys or influences the purchases.

More and more companies are constantly increasing their use of Direct Mail because it does a job that no other form of advertising will do.

McGraw-Hill has a special Direct Mail Service that permits the use of McGraw-Hill lists for mailings. Our names give complete coverage in all the industries served by McGraw-Hill publications — gives your message the undivided personal attention of the topnotch executives in the industrial firms. They put you in direct touch with the men who make policy decisions.

Some people have a wrong conception of Direct Mail. There's no hocus-pocus to it — there's no secret formula — nor is there need for an extensive department to plan and execute your mailing program. You don't even need your own mailing lists.

Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance in industrial personnel. Our lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nationwide field staff, and are maintained on a twenty-four hour basis.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want.

Ask for more detailed information today. You'll be surprised at the low overall cost and the tested effectiveness of these hand-picked selections.

McGRAW-HILL PUBLISHING CO., INC.
330 WEST 42nd STREET, NEW YORK 36, N. Y.

the U. S. Today, Reynolds, which now owns about 7,000 head of cattle, is the largest cattle raiser in the West Indies.

Reynolds is regarded as the "most popular employer" as far as trade unions are concerned, according to Frank Hill, head of the Trades Union Congress in Jamaica.

To protect the beauty of Jamaica's north shore from dust clouds caused by bauxite-drying operations, Reynolds has installed a $100,000 electrostatic dust precipitator.

From the hilly terrain of the British West Indies island, Reynolds has established a new industry, which not only benefits the metal firm but the Jamaicans as well.

Unlike Columbus, who was looking for a new route, but instead found Jamaica, and the Spaniards, who came only for gold, Reynolds has become a part of the life and economy of the Caribbean island.

NPA Requests Reflect Manufacturers' Boom

A major end-product of the relaxation in construction restrictions will be a boom for lighting fixtures and other electrical components for residential and commercial building.

This already is apparent in the manufacturers' applications to National Production Authority for October-December metal supplies, which ask for substantially more steel, copper, and aluminum than was allotted for July-September. Fourth-quarter requests from manufacturers of other types of electrical equipment are running at about the same level as in the third quarter. NPA says electrical equipment supplies in general are more than adequate. The only near-shortages are large motors (500 hp and up), high-voltage switchgear, and power transformers.

Power switchgear and heavy transformer demand grows—power switchgear and heavy transformer manufacturers are also asking for more metal in the fourth quarter than they consumed in the previous three-month period. This is the result of the growing power expansion program, which calls for a goal of 32 million kw by the end of 1954.

NPA has told the manufacturers that additional productive capacity will be needed in the industry during 1953 and 1954 to meet the increasing

A New Name for a Well-Known Directory

ANNOUNCING the NEW

McGRAW-HILL

Directory of Electric Utilities

formerly McGraw Central Station Directory

THIS well established directory covering utility personnel, organization, areas served, generation and distribution equipment in over 4,000 utility plants in U. S., Canada, and U. S. possessions is now ready for distribution. The name of this directory has been changed to keep pace with the standard nomenclature used throughout the industry.

McGraw-Hill Directory of Electric Utilities is the latest, most complete source of *facts* covering private and municipally operated companies, REA financed systems, government-controlled projects, holding, controlling and affiliated companies.

Bound in flexible Fabrikoid, fully thumbed-index, size 4½" x 8½". Price $30 per copy. 10% discount on five or more copies.

Send your orders direct to:

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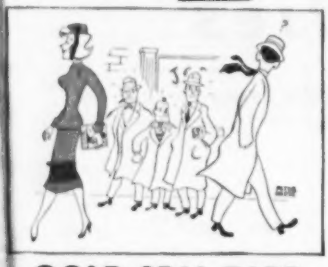
You can do a lot

with a little



GOLD SEAL TAPE

Wet or dry, hot or cold, in any weather, Gold Seal sticks to the job. Tears without raveling. Gives tighter, longer lasting joints. Ask for Gold Seal Tape — you'll save time and trouble. Buy it by the carton (10 rolls) or in single rolls. Jenkins Bros. (Rubber Div.), 100 Park Ave., New York 17, N. Y.

JENKINS

Gold Seal Tapes

FRICTION and RUBBER TAPES

A PRODUCT OF JENKINS BROS.
MAKERS OF FAMOUS JENKINS VALVES

demand for power switchgear. The manufacturers disagreed; they said they'll be able to take care of power requirements without expanding their facilities.

MANUFACTURING BRIEFS

National Electric Products Corp, Pittsburgh, Pa., has established an Electronics Division with headquarters at its Ambridge (Pa.) plant. The new division consists of two departments: Television & Radio, located at the Ambridge plant; and Radar, at the Elizabeth (N. J.) plant.

Westinghouse Electric Corp has made available a 28-page booklet, which outlines a preventive maintenance program. The booklet contains information on preventive maintenance for turbines, generators, switchboards, motors, controls, and many other types of electrical apparatus. For a copy of this booklet, B-5477, write Westinghouse Electric Corp, Box 2099, Pittsburgh 30, Pa.

"Treat Wood Right" is the title of a color-sound motion picture dealing with the use of pentachlorphenol for the preservation of wood. Produced by the Dow Chemical Co, the movie is available for scheduled showings. Write Dowicide Sales Department, Dow Chemical Co, Midland, Mich., for bookings.

A. O. Smith Corp's Welding Products Division has started a comprehensive sales training program to develop well-informed salesmen-technicians who will be able to cope with customers' problems. The program is designed to give trainees a broad understanding of welding techniques and applications.

Watch for Mini!

New
McGRAW-HILL BOOKS

CONTROLLERS FOR ELECTRIC MOTORS

Second Edition

1. Explains selection, operation, maintenance, and inspection of modern control apparatus. Describes commercial controllers—shows best methods for motor acceleration, speed control, braking, regeneration. Covers protective devices, magnetic amplifiers, magnetic clutches, eddy-current brake, crane control, d-c control, etc. Helpful facts on remote and supervisory control are included. By Henry Duvall James, Consulting Eng., and Lewis Edwin Markle, Design Eng., Westinghouse. 2nd ed. 418 pp., 312 illus., $7.00

ELECTRIC MACHINERY

2. An integrated treatment of a-c and d-c machines, showing how they work—their characteristics, performance analysis, and applications. Explains essentials of all rotating electric machines, and electromechanical energy conversion devices. Introduction to synchronous-machine theory and machine transients is included. How to analyze performance of machines and devices is shown. By A. E. Fitzgerald, and Charles Kingsley, Assoc. Professors of E.E., M.I.T. 702 pp., 457 illus., $8.50

PRIMER OF ELECTRONICS AND RADIANT ENERGY

Second Edition

3. Clear explanations of electronics and radiant energy—what they are, and what they do for us. Shows how electrons, protons, neutrons, and other subatomic energy particles behave—how radiant energy is controlled, their release is used. Tells how radio and TV, light and heat, ultraviolet and infrared rays, X-rays, etc., work, and how they are produced and controlled. Explains electric current, magnetism, radio circuits, tubes, etc. By Don Caverly, Commercial Eng., Sylvania Elec. Prod. Inc. 2 ed. 343 pp., 175 illus., $6.50

AIR POLLUTION

Proceedings of the United States Technical Conference on Air Pollution

4. Presents results of exhaustive researches; answers scores of questions on what contaminants are dangerous, and under what conditions; how these contaminants affect plant, animal, and human life; what kinds of equipment and methods control pollution. Edited by Louis C. McCabe, U. S. Bur. of Mines. 847 pages, 285 illus., 85 tables, $12.50

10-DAY FREE TRIAL

McGraw-Hill Book Co., 330 W. 42 St., N.Y.C. (36)
Send me book(s) checked below for 10 days' examination on approval. In 10 days I will remit for book(s) I keep, plus few cents delivery, and return unwanted book(s) postpaid. (We pay delivery if you remit with this coupon—same return privilege.)

☐ 1. James & Markle—Controllers for Elec. Motors—$7.00
☐ 2. Fitzgerald & Kingsley—Elec. Machinery—$8.50
☐ 3. Caverly—Primer of Electronics—$5.50
☐ 4. McCabe—Air Pollution—$12.50

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City ..... Zone..... State.....
Company .....
Position W-6-16-52

This offer applies to U. S. only.

New Electrical Construction

New electrical construction projects announced by private and government utility systems involving more than $70,000. Also listed are major industrial and construction jobs where electrical work is included.

UTILITIES

Proposed Construction

California—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars Roseville, transformer, distribution board, for Folsom Switchyard, Folsom Unit, American River Div., Central Valley Proj., Spec. DS 3723. L. N. McClellan, ch. engr.

Colorado — Bureau Reclamation, Dpt. Interior, Grand Lake Co., construct Salida and Gunnison sub-stations, Colorado-Big Thompson Proj., Spec. 704C256. L. N. McClellan, Bldg. 1A, Denver Federal Center, Denver, Colo., ch. engr.

D. C., Wash.—U. S. Eng., First and Douglas Sts. N.W., Wash., 25, D. C. transformer station and main secondary switchboard hospital wing U. S. Soldiers Home, Serial No. CIVENG 49-080-52-53.

D. C., Wash.—Office of the Architect of the Capitol, U. S. Capitol, Wash., D. C. Capitol Power Plant alterations and equipment imprvs. Davis Lynn, U. S. Capitol, Wash., D. C., archt.

Ga., Rome—General Electric Corp., c/o Robert & Co. Assocs., archts., 96 Poplar St. N.W., Atlanta, transformer mfg. plant, Approx. $3,000,000.

Kan., Topeka—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., 20,500 sq. ft. armament and electronics K1 shop, Forbes Air Force Base, Eng. 23-028-52-45.

Kentucky—Pennyrile Rural Electric Cooperative, Hopkinsville, 147 mi. rural distr. lines, headquarters, facilities, sys. imprvs., Todd Co. $1,460,000.

La., Lafayette—City, c/o Utilities sya., P.O. Box 208, addns. to electric distr. sya. and sub-station. Plans deposit $10.

Mass., Boston—U. S. Eng., 857 Commonwealth Ave., Boston, Zone 15, reconstr., rehabilitation of electrical facilities, Boston Army Base, Eng. 19-016-52-76.

Michigan—State Hy. Dpt., 222 Townsend St., Lansing, Zone 13, elevated power regulator and transformer house, on John C. Lodge Expressway, UI E 20 of 32-22, C1. Plans deposit $3, G. W. Tiedman, c/o owner, engr.

Minn., Minneapolis—U. S. Eng., 1709 Jackson St., Omaha, Neb., altering transformer sub-stations, Twin Cities Arsenal, Inv. 52-115.

Missouri—Central Electric Power Cooperative, Jefferson City, 39.1 mi. rural electric transmission line, Proj. Mo. 71-A, Moniteau, 69 kv line Contr. VI, Osage and Gasconade Counties. Plans deposit $10. Extended date. Frank Horton & Co., Lamar, engrs. CD 5/28.

Missouri—Missouri Public Service Co., Ralph J. Green, pres., Warrensburg, 32 mi. high voltage transmission line from Raytown to Pleasant Hill then to Harrisonville.

Montana and North Dakota—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., sub-station, office, warehouse and service facilities and addns. to Williston sub-station, Dawson Co. sub-station approx. 3 mi. west of Glendive, Mont., Williston sub-station approx. 4¼ mi. west of Williston, N. D., Fort Peck Proj. Spec. D-3732.

Nebraska—Bureau Reclamation, Dpt. Interior, P.O. Box 280, Casper Wyo., construct Chadron sub-station, Transmission Div., Missouri River Basin Proj., Spec. No. 703C-260.

North Dakota—U. S. Eng., Fort Lincoln, Box 300, Bismarck, power house draft tube gates, Garrison Dam and Reservoir Proj., Inv. 52-51.

North Dakota — Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Washburn, one 15,000 kva 220,000 grounded wye-to 41,800 delta-volt, 3-phase, 60 cycle, Class OA, outdoor power

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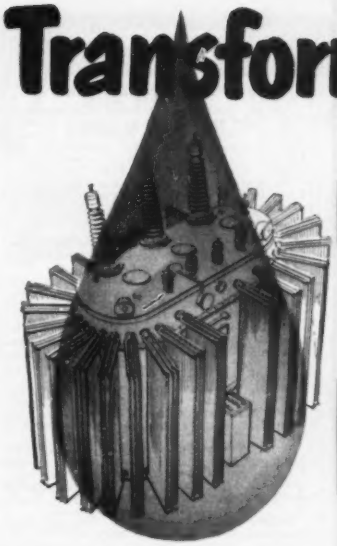

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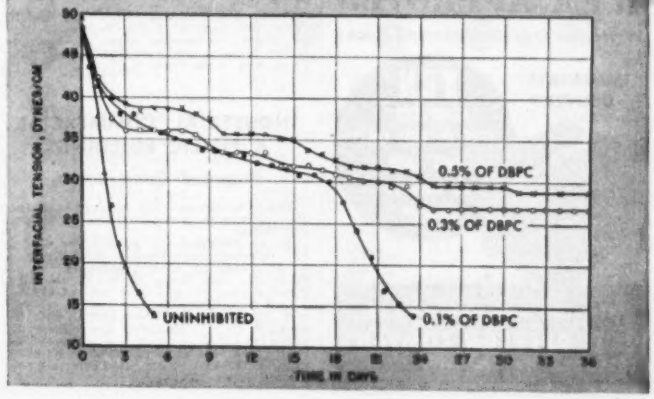

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transformer with automatic tap-changing-underload equip. with 3 tank-mounted lightning arresters, with one neutral current transformer and with provision for future addnl. of forced-air-cooling equip. for Washburn Sub-station, Transmission Div. Missouri River Basin Proj., Inv. No. DS-3728.

North Dakota—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., construct Dawson County sub-station, office warehouse and service facilities, Williston sub-station addns., Fort Peck Proj. Spec. DC 3732.

O., Painesville—City, City Hall, install 7,500 kw. generator to increase municipal electric plant capacity to 23,000 kw. $660,000; expand municipal power plant with installation of 150,000 lb. steam boiler and extend present boiler room, $495,316. H. Ralph Hadlow, Hipp Annex Bldg., Cleveland, consult. engr.

Oregon—U. S. Eng., City-County Airport, Walla Walla, Wash., main unit Generators 9 to 12 (inclusive) for McNary Dam, CIVENG 45-164-52-112.

Oregon—U. S. Eng., City-County Airport, Walla Walla, Wash., ten 111,500 hp. hydraulic turbine governors and accessories for Units 5 to 14 (inclusive), McNary Dam, Inv. 52-111.

S. C., Moncks Corner—South Carolina Public Service Auth., Moncks Corner, power plant and steam electric generating station. Ford, Bacon & Davis, Inc., 39 Broadway, New York, N. Y., engr.

S. C., Pinopolis—South Carolina Public Service Auth., Moncks Corner, power plant, superstructure, facilities and mechanical equip. installation. Ford, Bacon & Davis, Inc., 39 Broadway, New York, N. Y., engr.

South Dakota and Iowa—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., construct Fort Randall-Sioux City 230 Kilovolt transmission line, Transmission Div., Missouri River Basin Proj., between Fort Randall Dam near Lake Andes, S. D. to Sioux City, Ia. Spec. DC 3731.

Tennessee—U. S. Eng., 203 Federal Office bldg., Nashville, Zone 1, furnishing 4 actuator type governors for Old Hickory hydro-electric power plant, Cumberland River, Davidson Co., Serial No. CIVENG 40-058-52-38.

Texas—Lyntegar Electric Co-operative, Tahoka, 152 mi. rural distr. lines, 52 mi. 69 KV transmission line and sys. imprvs., Lynn Co. $1,700,000.

Low Bidders & Contracts Awarded

Arkansas—Al Johnson Constr. Co., Foshay Tower, Minneapolis, Minn., LB $4,899,815 hydroelectric power plant at Blakely Mountain Dam, Garland Co. U. S. Eng., P. O. Box 60, Vicksburg, Miss. Bids May 22.

Calif., El Centro—Ukropina-Polich-Kral, Box 425 Baldwin Park, Calif., CA, $616,549, power plant and appurtenant structures Drop 2, Hydro-Plant, Imperial Irrigation Dist., El Centro, Calif. Bids May 6, awarded May 20.

New York—Elmhurst Constr. Co., 53-09 97 Pl., Corona, N. Y., CA. Approx. $4,000,000, earth dam and hydro-electric power plant, Sacandaga River Niagara Mohawk Power Corp., 250 Park Ave., New York 17, N. Y.

N. Y., South Colton—Racquette Constr. Corp., Potsdam, N. Y. CA. $4,000,000. Hydro-electric generating plant on Racquete River. Niagara Mohawk Power Corp., 250 Park Ave., New York, N. Y.

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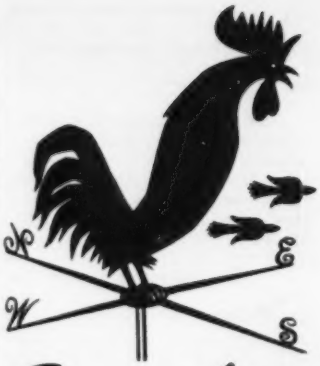
Ind., Covington—Olin Industries, Alton, Ill., celophane plant on 665 acre site. $20,000,000.

N. J., Paramus—L. Bamberger & Co., 131 Market St., Newark St., Newark, N. J., plans by Abbott, Merkt & Co., 10 E. 40 St., New York, 17, N. Y., shopping retail center, on 125 acre site at Routes 4 and 17, $5,000,000.

N. Y., New York—Metropolitan Life Insurance Co., 1 Madison Ave., Zone 10, plans by Lloyd Morgan & Eugene V. Meroni, 119 E. 40 St., Zone 17, 13 story office bldg., E. 23 and 24 Sts., and Madison and Fourth Aves. $23,200,000.



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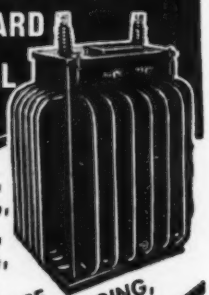

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BOOK REVIEWS

Communications

Principles of Radio. **By Keith Henney and Glen A. Richardson. Published by John Wiley & Sons, Inc, New York 16. 655 pages, illustrated. Price $5.50.**

This is a sixth edition. Major emphasis of this book is on the fundamentals of basic radio circuits. This edition contains full chapters on frequency modulation, television, radar, wave shaping circuits, and electronic test equipment.

Fundamental dc and ac circuit theory is covered in the first nine chapters, prior to the treatment of vacuum tube circuits.

Step by step examples have been included to illustrate the more difficult types of computations. Problems are of the type that are likely to be encountered in practice.

Transmission Lines

Electric Transmission Lines. **by Hugh H. Skilling. McGraw-Hill Book Company, New York 36. 414 pages, illustrated. $6.50.**

In an attempt to keep pace with recent developments in higher-frequency transmission, the author has compiled a broad presentation of the theory of transmission circuits with distributed constants, and their practical applications, which is valid at all frequencies. This text is designed primarily for undergraduate engineering students but even the expert engineer will find it useful for a breadth of knowledge beyond his particular specialty.

In line with the modern trend of presentation, the author gives more attention to rado-frequency lines than to telephone or power lines. First the concept of distributed constants is discussed. This is followed by a consideration of real circular functions, real hyperbolic functions and finally complex trigonmetric or hyperbolic functions. Mention of more advanced mathematics is handled in footnotes that contain matters of interest lying a little apart from the main discussion. Practical problems are presented at the end of each chapter.

Communication

Electronics for Communication Engineers. **By John Markus and Vin Zeluff. Published by McGraw-Hill Book Co, New York 36. 610 pages, illustrated. Price $10.**

Two of the editors of **Electronics** have here selected from the 1947-52 issues of that magazine articles that are fundamental to and practically pertinent to the field of communication. They have condensed them to accentuate the reference subject matter and grouped them by major topic headings. Admittedly a major portion is of most direct interest to broadcast, television, radar and even electronic music engineers. Nevertheless a sizeable fraction should be useful to the mobile radio, carrier and microwave engineer in power utility service. In attest to this conclusion there may be mentioned the following selection of subjects: voice-controlled "intercom," signal strength analyzer, regulated voltage divider, atmospheric noise measurement, nomograms for receiver gain and noise, hum reduction, carrier level regulator and carrier failure alarm.

Electronics

Primer of Electronics and Radiant Energy **By Don Caverly. Published by McGraw-Hill Book Co, New York 36. 344 pages, illustrated. Price $5.50.**

This book differs from many written in the electronic and engineering field in that it is not written for the engineer alone. Instead it is primarily aimed at

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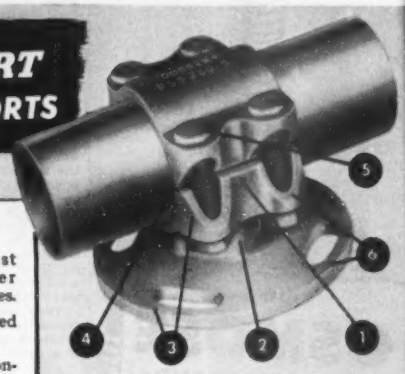

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the man in the street or the housewife, so they too may know something of electronics and radiant energy. Divided into four parts, the book begins with a section explaining the structure of the atom, molecule, isotopes. It follows with a description of these. The second part deals with magnetism. Part 3 is the largest section and deals with electromagnetic radiation. This covers the much discussed items as sonar, radar, atomic energy, etc. Lastly, a section is devoted to electron tubes. Being a second edition it differs from the first in that it incorporates the changes that have taken place in fifteen years since the first edition. These changes have been many indeed, as electronics and radiant energy are rapidly changing fields.

Electrophysics

The Nature of some of our Physical Concepts. By P. W. Bridgman. Published by Philosophical Library, New York. 64 pages, illustrated. Price $2.75.

Dr. Bridgman delivered three lectures at the University of London and they are here assembled. Primary among the objectives was to show the interrelation of hypotheses and experimentation not only with one another but with our verbal limitations of expression. Analysis is made of the respective inadequacies showing how past realization of them lead to refinements which culminated in instrumental verification. The three lectures dealt largely with the field concept (electrical and gravitational), the laws of thermodynamics and thermoelectricity.

AC Machinery

Alternating Current Machinery. by Benjamin F. Bailey and James S. Gault. McGraw-Hill Book Company, New York. 413 pages, illustrated. $6.00.

This text is written for undergraduate work in ac machinery. To help the student understand the essentials of ac machinery, the authors have chosen to present a thorough discussion of transformer theory as a foundation.

In the chapters on synchronous machinery, the use of synchronous-impedance theory is emphasized for a clear understanding of synchronous motor and generator operation.

The preponderance of polyphase induction motors in actual use is reflected in the author's extensive treatment of this phase. Influence of various methods of control upon motor behavior is discussed. Those qualities which bear upon different applications are emphasized.

Principal types of single-phase motors are described in detail to give the student an understanding of the operating characteristics of each type with a view toward intelligent application.

To preserve the continuity of discussion throughout the book, most of the more involved mathematical developments are presented in the last chapters.

Statistics

Elements of Statistical Method. By Albert E. Waugh. Published by McGraw-Hill Book Co., New York 36. 531 pages, illustrated. Prices $5.50.

This is a third edition. Emphasis is on general statistics. This text is planned for the beginner in the field. No attempt has been made to treat any aspect completely. Illustrations are taken from diverse fields to show the general applicability of the methods.

Only a reasonable familiarity with high school algebra is required, making this an ideal text for the executive who wishes to develop sufficient ability to understand statistical reports.

An entirely new chapter has been added on the "analysis of variance," which has until recently been treated only in advance texts.

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CATALOGS • BULLETINS

● **WIRE AND CABLE CALCULATOR:** A calculator is now being offered by the Triangle Conduit & Cable Co Inc, designed to help electrical contractors, industrial and power company engineers. It shows at a glance the approximate weight per thousand feet of solid and stranded wire cable with one, two or three conductors. It can be obtained by writing the company, Dept EWO, New Brunswick, N. J.

● **SELENIUM RECTIFIERS:** Technical Data Bulletin SR-1 has now been made available by the International Resistance Co, Special Products Division, 401 North Broad St, Philadelphia 8, Pa. It concerns the company's newly introduced hermetically sealed selenium rectifiers. Copies can be obtained from the company.

● **INSULATION PRODUCTS:** Complete descriptive information and technical data is contained in a new 24-page free catalog incorporating six bulletins. Included are No 499, which describes methods, materials and applications for fabricated insulators, No 499A discusses requirements, styles and materials, No 489 gives information on dispenser packaged cuffed motor slot paper, No 442 provides data on uses of bond vulcanized washer assortment, No 280 deals with standard and special sizes and styles for bond maple wood motor slot wedges and No 441 gives the advantages and sizes of space-saving curve formed fibre motor slot wedges. Free copies may be obtained by writing Insulation Manufacturers Corp, 565 West Washington Blvd, Chicago, Ill.

● **THREE PHASE WINDING HEAD:** The new Crown 3 phase coil winder head, built to cut time and cost of winding mush type coils for 3 phase motors is fully described in a new information page recently published. Write Crown Industrial Products Co, Attn: R. W. Damaree, Sycamore, Ill.

● **LIQUID FREE DEHYDRATOR:** This booklet covers complete data on new dehydrator for diesel fuel, gasoline, kerosene and fuel oils. Construction and dehydrating elements are fully described along with unique methods of removing large slugs of water. Write Bowser Inc, Fort Wayne, Ind.

● **THERMOMETERS:** A new Catalog No 6020 entitled Cam Programmer Thermometers describes a compact efficient approach to the problem of time-temperature control. It also contains illustrations of use, advantages, technicality and versatility of the new instrument. Write Station 40, Minneapolis-Honeywell Regulator Co, Brown Products Div, Wayne & Windrim Aves, Philadelphia 44, Pa.

● **INSTRUMENT TRANSFORMER:** The 1952 edition of the Instrument Transformers Buyer's Guide, containing basic, up-to-date information on instrument transformers has just been released. The fully illustrated 94-page publication, GEA-4626E gives ratings, ASA accuracy classifications and prices of all GE transformers. It may be received by writing General Electric Co, Schenectady 5, N. Y.

● **DRAWOUT SWITCHGEAR:** A 31 page bulletin Nemco Class 722 describing the use of low voltage metal enclosed drawout switchgear using air circuit breakers has just been released by the Nelson Electric Mfg Co, Tulsa, Okla.

● **UNITYPE CUBICLES:** The Brown-Boveri Corp of 19 Rector St, New York 6, N. Y. has issued a 15-page bulletin on their Unitype air blast breaker cubicle switchgear. Write care of company for bulletin No P012-3058.

● **STANDBY EMERGENCY POWER:** The requirements of standby power, the types of service available and a detailed discussion of controls for automatic start-

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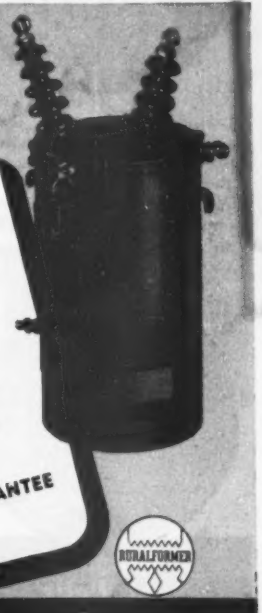

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stop operation is featured in the quarterly publication, "E-M Synchronizer No. 35." Copies available upon request from Electric Machinery Mfg Co, 1331 Tyler St, NE, Minneapolis, Minn.

● MECHANICAL FREEZERS: Industrial mechanical freezers capable of producing and holding round-the-clock temperatures of as low as Minus 165 degrees F are described in the condensed specification bulletin just issued by the Industrial Division of the Weber Appliance Co Inc, Indianapolis 3, Indiana.

● PIPE TOOLS: Beaver Pipe Tools, Inc, announced the completion of their 1952 catalog and data book. Pertinent information on three Pipe and Bolt Machines, Models A, B, and E, Units C-1 and C-2, Ratchet Threaders, Reamers, Cutters and other pipe tools; both hand and power. Copies may be obtained by writing the company, Dana Ave, Warren, Ohio.

TEMPERATURE CONTROLS: Catalog 400, a 52-page catalog on Thermoswitch temperature controls has just been published by Fenwal Inc of Ashland, Mass. It describes design, operating characteristics and typical installation of each of the ten variations of the device. It is illustrated with drawings, photos and graphs.

● OSCILLATING CONVEYORS: A new 24 page illustrated book No. 2444 on Positive Action Oscillating conveyors for conveying, feeding, cooling and screening a variety of loose bulk materials has been made available by the Link Belt Co, 307 N. Michigan Ave, Chicago, Ill. The booklet will be sent to interested readers upon request.

● FLOW METERS: Bristol's 40 page bulletin Flow Meters describing that company's "Series 500" line of flow meters is now available. Copies of Bulletin 51605 can be had by writing the Bristol Company, Waterbury 20, Conn.

● VACUUM PRESSURE IMPREGNATING: Helpful information on the impregnation of electrical equipment, metal castings, leather and textiles, lumber and other materials can be found in bulletin 51B compiled by Process Industries Engineers Inc of Pittsburgh.

● VALVE TOPICS: A new periodical, Valve Topics, edited for those who design, specify, use or purchase stainless steel valves and fittings. It will deal with providing information about uses and abuses of stainless steel valves. To receive issues free, send name, title and company address to Copper Alloy Foundry Co, Bloy St & Ramsey Ave, Hillside 5, N. J.

● FREQUENCY RECORDER: The Electronik frequency recorder is described in data sheet 9.1-8. This recorder is applicable to central station power systems for instantaneous measurement of frequency. Principle of operation, as well as specifications, are included in the data sheet. Minneapolis-Honeywell Regulator Co, Philadelphia 44, Pa.

● MICROWAVE EQUIPMENT: A new 8-page booklet, B-5448 has been made available describing type FB-1 microwave equipment. Included are descriptions designed to provide reliable communications channels of telemetering supervisory control, voice communication, protective relaying, teletyping, facsimile and load control. Write to Westinghouse Electric Corp, Box 2099, Pittsburgh 30, Pa.

● RADIATION INSTRUMENTS: A new two color 8 page bulletin Radiation Instruments containing essential information on ten recent nuclear radiation detectors has been announced by General Electric. Designated GEA 5735, the illustrated booklet covers instruments designed for industry, hospital, laboratories and civil defense work. Write General Electric Co, Schenectady 5, N. Y.

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● LEAD CLAD STEEL AND COPPER: A new 22 pg catalog entitled "The History and Development of Ferrolum Lead Clad Steel and Cupralum Lead Clad Copper" is being distributed by Knapp Mills Inc, 23-15 Borden Ave, Long Island City, N. Y. It discusses design and process problems that are essential for engineers, designers and technicians to understand their characteristics.

● HOT PROCESS WATER SOFTENERS: A new 32 pg booklet, "Permutit Hot Process Water Softeners" containing data on hot process treatment of boiler feedwater has been prepared by the Permutit Co, 330 West 42 St, New York 36, N. Y. A number of different designs are illustrated and described including the conventional and sludge-blanket types with and without built-in deaerating equipment. Copies available from the company.

● PLASTICS FOR ELECTRONICS: A new booklet is currently being distributed by the Emerson & Cuming Co, 126 Massachusetts Ave, Boston 15, Mass, describing a number of new plastic materials products and techniques. The bulletin should be of interest to design, engineering and purchasing personnel and is free upon request to the company.

● LITERATURE AND MOVIE INDEX: The Reynolds Metals Co, 2500 So Third St, Louisville, Ky has just published a new index listing technical literature and motion pictures available to people in the metal working industry. "Literature & Movie Index" will be sent to anyone upon request, without charge.

● BRUSH CONTROL: A new booklet "How to Clear Rights-of-Way" has just been released providing the latest information on chemical brush control. The bulletin furnishes information on what chemicals to use, recommended dilution and methods of operation for both foliage spray and basal bank treatments. Write for copies to the Thompson Chemicals Corp, St Louis 3, Mo.

● MATERIAL HANDLING: The American Hoist & Derrick Co, St Paul 1, Minn has released a new catalog which is now available. It covers all equipment, their giant revolver cranes and their extensive line of locomotive cranes, hoists, material elevators and car pullers. Copies of Catalog GC-2 can be obtained by writing to company.

● VERTICAL INDUCTION MOTORS: Construction features of large vertical induction motors widely used for pumps and other vertical drives are described in a new bulletin recently released. The booklet covers motor ratings in 40C, 60 cycle from 60 hp, 200 rpm to 800 hp and larger 1800 rpm. Copies of the 05B7629 are available upon request from Allis-Chalmers Mfg Co, 932 S 70 St, Milwaukee, Wisc.

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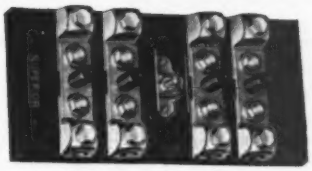

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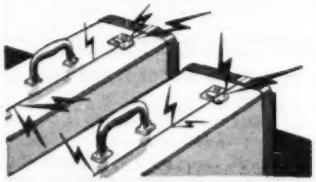

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DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-3728) will be received at Denver, Colorado, until July 8, 1952, for furnishing one 15,000 kva, 220,000- to 41,800-volt, 3-phase, class OA, power transformer for Washburn Substation, Transmission Division, North Dakota, Missouri River Basin Project. Delivery is desired within 325 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver, Colorado.

TECHNICAL LITERATURE

Generator Cooling: A new article entitled *Supercharged Cooling of Generators* is now available in reprint form. It describes some of the most important steps that have been taken in the design of the first super-charged, hydrogen-cooled generator. It may be obtained by writing for Bulletin 05477T3 from Allis-Chalmers Mfg Co, 932 S 70 St, Milwuakee, Wis.

Lighting Maintenance: *The Why, When and How of Modern Lighting Maintenance*, a new 12-page bulletin, is now available. Emphasizing the high cost of low lighting maintenance standards, the bulletin stresses that planned maintenance of both light sources and reflecting surfaces saves costly time and useful light. Write the Lighting Div, Sylvania Electric Product Inc, 60 Boston St, Salem, Mass.

Corrosion Testing: The 1951 Edgar Marburg lecture by Francis L. La Que entitled *Corrosion Testing* is now available. It comprises a survey of corrosion testing programs and methods of corrosion testing. Copies of this 96-page booklet may be procured from the American Society of Testing Materials, 1916 Race St, Philadelphia 3, Pa at $1.50 per copy.

Electric Ranges—*The Electric Range Section* of the Domestic Appliance Installation is now available. Prepared by the Wiring and Specifications Committee of EEI, it may be obtained from the Edison Electric Institute, 420 Lexington Ave, New York, N. Y.

Insulating Materials: *Symposium on Thermal Insulating Materials*, a new ASTM publication has recently been released. It provides important data on the components of thermal insulating properties such as specific heat, emissivity, diffusivity, moisture vapor transmission, and the effect of moisture on thermal conductivity. Copies may be obtained from the American Society for Testing Materials, 1916 Race St, Philadelphia, Pa at $1.50 per copy.

Parallel Tap Changing: Reprints are now available of the article *Parallel Tap Changing Under Load* from the Westinghouse Electric Corp, Dept T, Transformer Div, Sharon, Pa. It describes the most recently developed method for the parallel operation, step by step switch control and six other techniques commonly used. Request Reprint No 4776.

Steel Castings: *Recommended Practice for the Welding of Steel Castings* is a new 40-page booklet just published. It will be of use to all industries in the quality control of casting welding, cast weld construction and composite fabrication. Copies available at 35¢ each from the Steel Founders' Society of America, 11 West 25 St, New York 11, N. Y.

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1	400	Westg.	Non-condensating — 125/150 lbs. I.S.P. 5/10 lbs S.P. — 240/480 v 3 ph. 60 cy.
1	300	G.E.	Non-cr. Condtg. 150/175 I.S.P. 5/15 S.P. — 480 v. 3 ph. 50 cy.

SYNCHRONOUS CONDENSERS

KVA	Make	Type	Volts	Speed
1—8000	Whse		2400/4160	600

MOTOR GENERATOR SETS

3 ph. 60 cy.

Qty	KW	Make	Speed	DC Volts	AC Volts
2—	2000	G.E.	600	600 25 cy	11000
1—	1500	G.E.	720	600	13200
1—	1500	G.E.	360	275	2300/4400
1—	1000	G.E.	900	250	4160/8320
1—	1500	G.E.	600	600	2300/4160
2—	1000	Whse.	900	600	2300/4160
1—	500	Whse.	900	250	6600/13200
1—	800	Whse.	1200	125/250	2300
1—	500	Whse.	900	250	440
1—	500	G.E.	720	125	2300
1—	400	G.E.	720	275	440/2300
1—	350	G.E.	900	125	4150
1—	150	G.E.	1200	275	2300
1—	150	Whse.	1200	275	2300

TRANSFORMERS—60 Cycle

KVA	Make	Type	Ph	Voltages
3—1250	G.E.	HVDDJ		6600x550
3—1250	G.E.	HT	3	2280-/13200x440/2300
1—1150	A.C.	OSSC	3	13800x480/2400
1—1000	G.E.	HVDDJ	1	2300x440
3—800	A.C.	OSSC	1	11800x6900
9—300	G.E.	HT	3	34000x240/480

BELYEA COMPANY, INC.

OFFICE & SHOP
51 Howell St., Jersey City 6, N. J.

REBUILT AND NEW

GUARANTEED MOTORS
M.G. SETS • GENERATORS

Hoists • Compressors • Transformers
Units of Every Size and Description

SQUIRREL CAGE MOTORS

3 Phase, 60 Cycle, 220 or 440 Volts
(*2200 Volts or higher)

H.P.	Make	Type	Speed
1000	*G.E. (New)	K63478	1800
750	*G.E.	RT	720
500	*G.E.	FBG	1600
450	*G.E.	KF-5678	1200
400	*Cont. (New)	NZ	1800
400	*G.E.	IK	514
450	*Cr.-Wh.	SC	2800
300	G.E.	IE-K	1200
300	Al.-Ch.	AR	900
300	*Westg.	CS	3600
2			

ENGINE-GENERATOR SETS

KVA	Make	Type	Volts	RPM
200	G.M.	6-268A	480	1200
100	G.M.	6-71RC	480	1200
31	Cum.-Reg.	H-1-6	120/208	1200
25	LeMot	20-A	120	900
10	Onan	P236G	115/230	1800
1½KW	Kohler	D-7551	110 DC	1000
1	Onan	10L-103	115	

AC SYNCHRONOUS MOTORS

3 Phase, 60 Cycle, 220 or 440 Volts
(*2200 Volts or higher)

*H.P.	Make	Type	P.F.	Speed
800	G.E.	T8984	1.0	1800
700	G.E.	TS		514
320	*Al. Ch.	Dr. Pt.	1.0	720
300	Cr.-Wh.	Eng.	1.0	300
250	*Al. Ch.	Dr. Pt.	.8	720
150	*Westg.		1.0	300
125	El. Machy.	Syn.	1.0	900
125	Cr.-Wh.	103-S	1.0	900
115	E-M	EM	1.0	240
100	Cr.-Wh.	103-S	.8	900

WRITE TODAY

WE'LL SELL, BUY OR TRADE
PHONE CANAL 6-2980

CHICAGO *Electric Co*

1324 W. CERMAK ROAD
CHICAGO 8, ILL.

—TRANSFORMERS—

BOUGHT AND SOLD

We carry a large stock of transformers, and invite your inquiries. New Transformers built to your specifications.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.
One Year Guarantee.

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
SINCE 1912 CINCINNATI 27, OHIO

New and Used Equipment Available for
POWER PLANTS, SUBSTATIONS, TRANSMISSION LINES AND CONSTRUCTION
Send for new list to
EBASCO SERVICES INCORPORATED
APPARATUS EXCHANGE Two Rector St., New York 6, N. Y.

POWER HOUSE EQUIPMENT

2—6000 KVA, 1ø, 60 cycle, 13,200/2940 V, Westinghouse transformers
6—2000 KVA, 1ø, 60 cycles, 13,200/2870 V, Westinghouse transformers
4—90 KVA, 1ø, 60 cycle, 2750/220/110 V, Westinghouse transformers
6—30 KVA, 1ø, 60 cycle, 2750/110 V, Westinghouse transformers
3—870 KVA, 1ø, 60 cycle, 3500/3500 V, Westinghouse transformers (Bus tie)
12—150 KVA, 300 A, 13,200 V, Metropolitan Division Corp. reactors
10—60 KVA, 1ø, 3,000 V, General Electric regulators.
26—60 KVA, 1ø, 3,000 V, Westinghouse regulators

86—Westinghouse type S-13, 600 to 1,600 amps, 3,000 to 15,000 V truck switches

2—Westinghouse type F-10, 200 amps, 2,500 V, 3 PST, oil circuit breakers
1—20 Panel vertical type control board
1—22 Panel relay board
1—2 Panel LT AC board
4—Buffalo Forge Company blowers (without motors)
2—SF Sturtevant Company blowers (without motors)
1—Traveling Crane with 1—six-ton, and 1—two-ton trolley hoist
1—Traveling crane with 1—three-ton trolley hoist

Eastern Scrap & Salvage Corporation
63 Muirhead Avenue Trenton 7, N. J.
Trenton 5-6349

FOR SALE

IMMEDIATE DELIVERY

DIESEL GENERATING PLANT
Complete plant, 360 HP. Marine Diesel with 312 KVA Generator, 60 Cycle 2300 volts.

CENTRIFUGAL PUMP
Gardner 10X 8—20 HP GE Motor, With Controls.
Gardner 12 X 10—30 HP GE Motor, With Controls.

AIR COMPRESSORS (Stationary)
American Well Works Tandem, 500 GPM —at 80#.30 HP GE Motor with controls.

ALL THE ABOVE EQUIPMENT ARE IN OPERATING CONDITION AND HAVE BEEN USED VERY LITTLE. BUYER TO REMOVE ANY OR ALL EQUIPMENT PURCHASED WITHIN 30 DAYS FROM DATE OF SALE.

QUILTY ENGINEERING COMPANY
Industrial Buildings
435 W. Spring Ave. Naperville, Ill.
Phone Naperville 552

30000 — Trans CROSBY Cable clamps — 3000 poles. 3000 H.P. new G.E. Mtr.; 2-1000 H.P. syn. Damp Proof.
BUILDINGS—struct steel with cranes—New all sizes. Boilers—Package 30—150 H.P. oil-gas fired in stock. 1000 H.P. 500 # pressure B.W. also 300 H.P.
3 drum low head 200—300—400 H.P. all pressures. Sect. header 450—600—700 oil-gas spreader stokers. 300 H.P. Kewanee oil-gas fired—
Turbines—600 kw D.C. 5000 kw A.C.—all sizes.
H. A. Woodworth, 611 Olive, St. Louis, Mo.
Main 1071 Republic 2300

BARGAINS
GUARANTEED TRANSFORMERS

100—50 KVA. and under late type, pocket bushing with taps 11000-12000 X 120-240 volts. Send for list.
3—23 KVA., 2200 volts, 100 amps., type IRS Gen. Elec. outdoor line voltage regulators.
Large Stock of Motors, Generators Etc.
SEND FOR LIST

Keystone Power Plant Equipment Co.
8409 Hagerman St. Phila. 36, Pa.

NEED DIESEL-GENERATOR?
QUICK ACTION REQUIRED
CONSIDER BEST OFFER

Must move 1140 hp—1000 kw 2400 volt Baldwin-DeLaVergne-Elliott Unit. Noted for ability to burn boiler oil. Complete with all auxiliaries. Need space for larger unit to be installed. May be seen running along with 2 other duplicates which we plan to retain in Grand Haven, Michigan Municipal Power Plant.

BOARD OF PUBLIC WORKS
City Hall Grand Haven, Mich.

NEW - FOR SALE - NEW

GENERAL ELECTRIC UNIT SUBSTATIONS
and
OUTDOOR METAL CLAD SWITCHGEAR

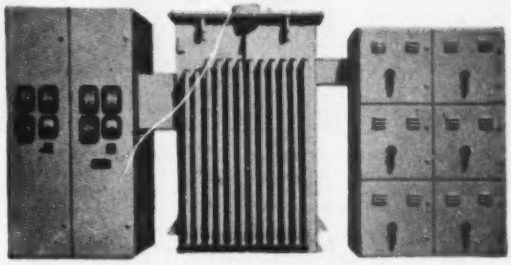
3—500 KVA INDOOR UNIT SUBSTATIONS: 3-Phase, 60 cycle self, cooled pyranol-filled transformer 4160 V. Delta-240 V. Delta

1—300 KVA INDOOR UNIT SUBSTATION: 3-Phase, 60 cycle, self cooled, pyranol-filled transformer: 4160 V. Delta-480 V. Delta

1—OUTDOOR METAL CLAD SWITCHGEAR: G.E. Type MI-8, 4160 V., 3 phase, 3 wires, 60 cycles, arranged for operation upon a ground system.

IN ORIGINAL CRATES

IMMEDIATE DELIVERY



500 KVA UNITS—LOW VOLTAGE FEEDER SECTION:

7—600V. Air Circuit Breakers, triple pole single pole, drawout type, manual, with adjustable time overcurrent protection, and inst. trip:
- 1—Main Transformer secondary breaker, 1600 A.; 50,000 A. interrupted rating.
- 6—Feeder Breakers, each 600 A.; 25,000 A. interrupted rating.

300 KVA UNITS—LOW VOLTAGE FEEDER SECTION:

7—600 V. Air Circuit Breakers, triple pole single pole, drawout type, manual, with adjustable time overcurrent protection, and inst. trip:
- 1—Main transformer secondary breaker, 400 A.; 25,000 A. interrupted rating.
- 6—Feeder Breakers, each 200 A.; 15,000 A. interrupted rating.

SWITCHGEAR—POWER CIRCUIT BREAKER

G.E. type AM-5-100, 600 A.; interrupted rating 13,800 A. at 4160 V., 100,000 KVA, 15 Seconds Duty.

GREEN & ASSOCIATES

P. O. BOX 5665 — TEL: MONROE 6-2478 — CHICAGO, ILL.

SUBSTATION EQUIPMENT

TRANSFORMERS

QU.	KVA	MFR.	VOLTAGE
2	333	G. E.	69300—2400/7200
3	75	A. C.	66000/34000—7200/12470 Y
4	2500	West.	44000—11000
3	150	G. E.	44000—7200/12470 Y
3	100	G. E.	44000—2300
2	75	West.	44000—7200/12470 Y
3	5333	West.	43800—13900
3	5000	G. E.	38100/66000—6600
1	18750	A.B.B.	34840—11000, 3 ph.
1	900	G. E.	33000—2300, 3 ph.
3	100	West.	33000—240/480 NEW
3	100	A. C.	33000—7200/12470 Y
3	75	Westg.	33000—7200/12470 Y
4	450	A. C.	25410/44000—13250/23000
6	100	G. E.	22000—7200/12470 Y
6	50	G. E.	22000—2300
3	37½	G. E.	22000—6900
6	200	G. E.	13200—2300
4	750	G. E.	11000—440
3	250	Phila.	7200—220/440
6	25	Mot.	7200/12470 Y—120/240
3	500	Phila.	6900/11900—550
3	333	Phila.	6900/11900—550
3	150	Westg.	6900—2300
3	200	G. E.	6600/11430—575
3	37½	G. E.	6900—230/460
2	100	G. E.	4800/2400—480/240
3	333	G. E.	2300—230/460
1	100	G. E.	2300—575, 3 ph.
3	100	West.	2300—460/230
3	75	Mot.	2400—120/240
6	50	West.	2400—114/228 DRY TYPE
3	30	West.	2200—575

INDUCT. REGULATORS—OUTDOOR

1—140 KVA G. E. 200 A. 4000 V. 3 ph.
1—46 KVA West. 200/400 A. 2300 V.
6—30 KVA West. 150/300 A. 2400 V.
2—36 KVA G. E. 75/150 A. 4800 V.

CIRCUIT BREAKERS

1—600 A. 73 KV G. E. FHKO-236-500 MVA
1—400 A. 87 KV G. E. FHKO-236-500 MVA
1—1200 A. 15 KV G. E. FKO-139-350 MVA
1—600 A. 15 KV G. E. FKO-139-350 MVA
1—600 A. 15 KV G. E. FHKO-136-1328-B6
4—600 A. 15 KV G. E. FHKO-139-750 MVA
2—600 A. 15 KV G. E. FLO-15-240 MVA

BREW, WOLTMAN & CO., INC.

52 Church St., New York 7, N. Y.

DIESEL POWER

FOR

IMMEDIATE SHIPMENT

UNIT CAPACITIES—10 TO 1875 KVA

A.C.—50 AND 60 CYCLES

VARIOUS VOLTAGES

A PARTIAL LISTING OF OUR INVENTORY

KW	Make	Model	HP	RPM	KW	Make	Model	HP	RPM
1136	Fairbanks Morse	38D	1600	720	320	Enterprise	DSG-6	560	450
1100	General Motors	16-278A	1600	720	300	General Motors	8-268A	450	1200
750	General Motors	12-567	1060	720	200	General Motors	6-268A	350	900
600	General Motors	8-278A	750	720	100	General Motors	3-268A	150	1200
500	General Motors	8-567	730	720	100	Worthington	BB-6	180	600
350	Baldwin	VO-6	510	450	60	General Motors	6-71	90	1200
320	Buckeye	80	480	600	30	Internat'l Harvester	UD-14	48	1200

D.C. UNITS ALSO AVAILABLE

A. G. SCHOONMAKER COMPANY, INC.

ENGINE DIVISION, 50 CHURCH ST., NEW YORK 7, N. Y.

J. L. HEMPHILL & CO.

ELECTRICAL ENGINEERS & EQUIPMENT

TRANSFORMERS

1—1500 KVA G.E., 3 Ph., 4150V., 2300V Pyranol
1—1500 KVA Penn. 3 ph., 4150V. Y 2400V Delta
1—200 KVA G.E., 3 Ph., 2400-220 Sec.
3—100 KVA Wagner, 1 Ph., 240V pri., 120V sec.
2—100 KVA Newark, 440V 3 Ph., 229V 2 Ph.
6—50 KVA G.E., 1 Ph., 13,400V. 120/240 Sec.
1—25 KVA G.E., 1 Ph., 660V. pri., 110/220 sec.

SYNCHRONOUS MOTORS

1—300 H.P., Elec. Mach. 720 RPM. 3 Phase 60 cyc. 2200V T E F Cooled Outdoor service.
1—150 H.P., G.E., 1800 RPM, 220V.
3—150 H.P., Al. Chal. 300 RPM, 440V.

MOTOR GENERATOR SETS

1—1000 KW G.E., 600 V. 514 RPM. 4000V Ex.
1—200 KW Wmc., 275V. 900 R.P.M., 220 V Syn.
1—175 KVA West., 1 Ph., 220V, Motor 3 Ph., 440V.
1—150 KW. G.E., 125/250V, 1200 RPM, 2300 Syn
1—100 KW G.E., 250V, 900 RPM, 2300V. Syn.
1—75 KW G.W. 250V, 1200 RPM, 2300/3100V Syn.

SLIP RING MOTORS

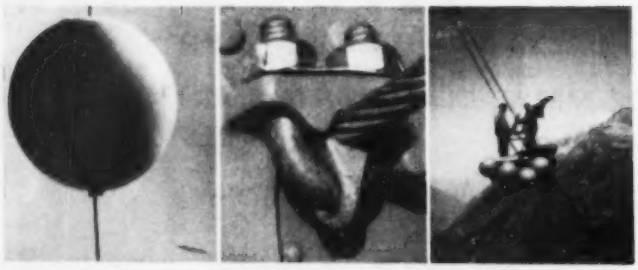
1—200 H.P. West. CW, 600 RPM, 440V.
1—250 HP West., CW, 600 RPM, 440V.

SYNCHRONOUS CONDENSER

1—200 H.P. West. CW, 600 RPM, 440V.
1—2500 KVA Whse., 720 RPM. 2200V with DC EXC.

Large Stock of A.C. and D.C. Equipment

LETTERS TO THE EDITOR



ALUMINUM SPHERES used to mark power lines near airports in Switzerland are 24 in. in diameter and painted yellow for maximum visibility. Attaching device, center, secures spheres to high tension conductor. Train car, right, is used to transport and attach the spheres to the transmission line at a distance of about 150 ft

Swiss Use of Aluminum Spheres

To the Editor:

On page 72 of your January 14 issue is an article entitled "The Swiss Do It—Why Can't We" which has aroused our interest. I am wondering whether anyone in your organization has or could readily obtain more details on such an installation. Do the Swiss attach it rigidly to the conductor or is it allowed to swing?

L. A. Phillips
Line and Substation Dept.
Pennsylvania Power & Light Co.
Hazleton, Pa.

• Here are the details.

To the Editor:

I am sending you photographs of the aluminum spheres used to mark power lines near airports in our country.

As stated in your editorial in Electrical World of January 14, 1952 these spheres have been used for 15 years on the transmission lines built by our company.

Test pilots have decided that the sphere is the most efficient type of signal for marking high tension lines.

I hope that these pictures are sufficient for your purpose.

R. Voegeli
Chief Engineer of
Transmission Lines
Motor-Columbus
Société Anonyme d' Entreprises
Electriques
Baden, Switzerland

That's Right; GE Did

To the Editor:

In the May 12 issue of Electrical World, you have in the Sales and Service section a very interesting item (including photograph and floor plan) over the title "Low Cost Homes Can Have Air Conditioning, Too."

I will appreciate your advising where I can get more information on this house plan.

It is noted that the General Electric Co seems to have had something to do with the plans.

J. G. Hamilton
842 Wisconsin Ave
Oak Park, Ill.

• The story to which reader Hamilton refers was based, as he suspects, on material supplied by the General Electric Co, Schenectady, N. Y.

Undersea TV

To the Editor:

In Electrical World of April 14, there was an article on page 32 "Will Britain and France Interconnect." In that article on page 33 is this statement ". . . or by the recently developed undersea television." I would appreciate some technical information on this "undersea television." Can it be used in muddy water? Will you have someone send me some information, or let me know where I can obtain it?

A. A. Mabson
Asst Chief, Engineering Div
Corps of Engineers, U. S. Army
New Orleans District
New Orleans 9, Louisiana

• The article on page 73 of our June 2 issue should answer this.

Gas Company Winners

To the Editor:

I notice in the May 19 issue that you listed many of the winners of awards in the 1952 Better Copy Contest conducted by the Public Utilities Advertising Association.

However, in this listing the names of some of the first place winners were omitted. I presume that the omission was caused by the fact that these awards were won by gas utility companies as the article states that only electric utilities and combination utilities are included in the list you published.

Could you tell me who the winner of the first award is in the classification for complete programs in Group A? Who was winner of first place in the classification of a single newspaper advertisement on any subject in Group A? Who won first prize in Group B in the classification of window displays? Who won first prize in Group A and Group B and Group C in the classification for car and bus cards and truck posters? Who won the first award in Group C in classification of outdoor advertising? And finally, who won the first award in the classification which concerned television programs?

C. Fred Westin
Assistant Director of Advertising
Public Service Electric & Gas Co
Newark 1, New Jersey

• It's just an old Electrical World custom to ignore the gas company winners. The reason is that in the past no one ever expressed any interest in them. However, we are happy to supply these answers to reader Westin's questions and the gas company winners are:

Complete programs—A: East Ohio Gas Co, Cleveland.

Single newspaper ad on any subject—A: East Ohio Gas Co, Cleveland.

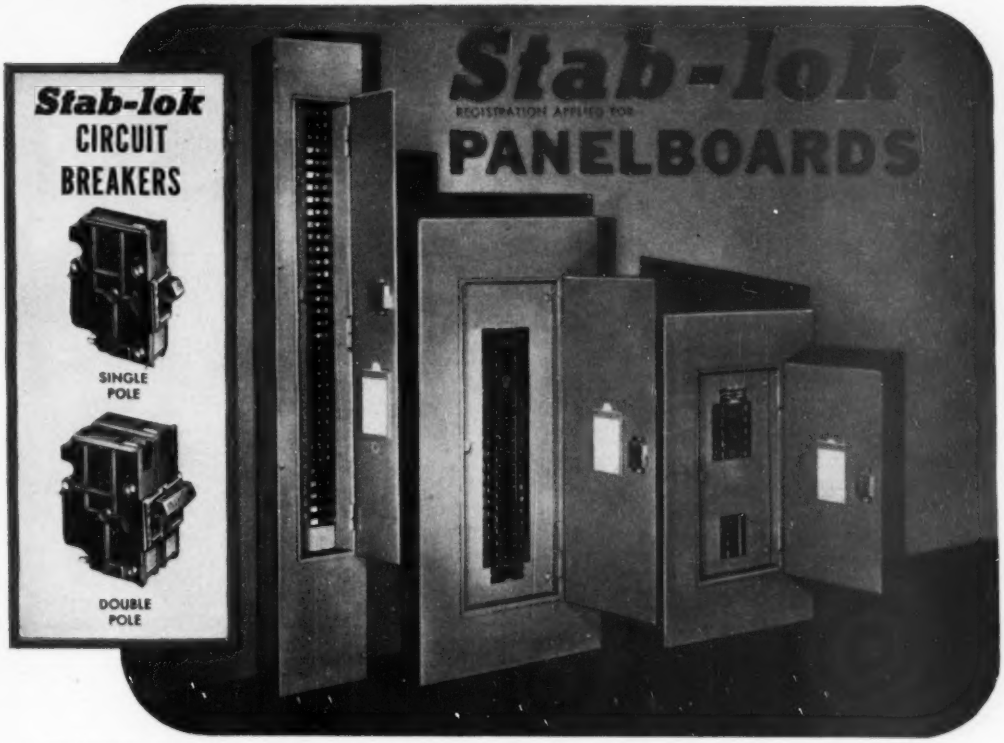
Window display—B: Laclede Gas Co, St. Louis.

Car and bus cards and truck posters—A: Southern California Gas Co, Los Angeles; B: Laclede Gas Co, St. Louis; C: Portland Gas & Coke Co, Portland, Ore.

Outdoor advertising—C: Hartford Gas Co, Hartford, Conn.

Television:—Milwaukee Gas Light Co, Milwaukee.

WHY WAIT? IN MINUTES, YOU CAN ASSEMBLE



NO MORE WAITING for factory panelboard assemblies. Simply get the correct size enclosure and the required number of one and two pole Stab-lok Circuit Breakers from your distributor's stock and assemble your panelboard in minutes. These Federal Noark Panelboards meet most any requirement, too, for they're available up to 42 circuits.

And when you install Stab-lok Panelboards you get the time- and money-saving advantages of Federal Noark modern design. There are 4½" gutters for easy wiring . . . and the whole interior is quickly removable to give you complete box accessibility for wire pulling. The trim lines up automatically. Polarity sequence bussing provides full flexibility for practically any circuit requirement.

For on-the-spot delivery and today's lowest costs, order Federal Noark Stab-lok Panelboards from your distributor. Federal Electric Products Company, 50 Paris St., Newark 5, N. J.

WHY STAB-LOK PANELBOARD IS QUICKEST, EASIEST TO INSTALL

BREAKERS SNAP IN PLACE: No screws! No tools! Slots in bussing take either single or double pole Stab-lok circuit breakers.

ONE MAN INSTALLATION: Trim hangs on a support bracket, leaving workman's hands free. Holes always line up.

REMOVABLE INTERIORS: Simply lift the interior from the box. To replace you merely hang on support bracket.

AUTOMATIC ALIGNMENT: If box is installed at an angle, merely shift trim front. Springs give positive, automatic plaster alignment, too.

DEAD FRONT FOR SAFETY: Filler plates give panelboard solid, unbroken front. With door locked, the panelboard is tamperproof.

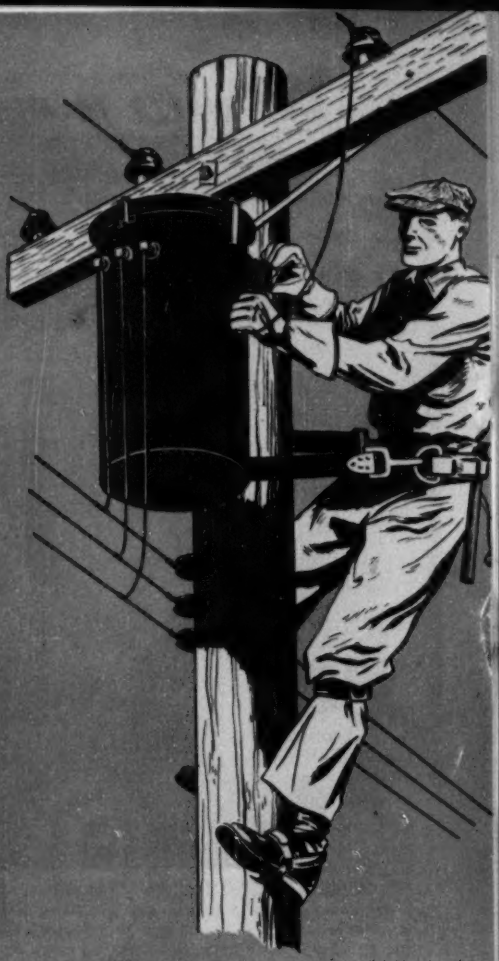
FEDERAL NOARK

Federal NOARK

Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct ★ Sales offices in principal cities.

TRANSFORMER OPERATORS QUIZ:

"What outstanding bushing improvement by Kuhlman reduced line connection time 50%?"



Time was when linemen connecting transformer primaries found the job taking twice as long as it does today. That was before Kuhlman stepped into the picture with a revolutionary bushing clamp which made other types obsolete almost overnight!

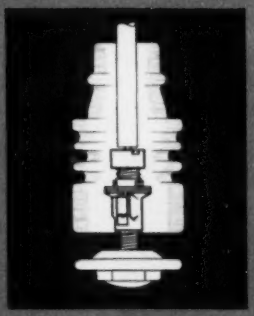
And just as Kuhlman blazed a trail on this important feature, so did it also point the way on many other outstanding transformer developments, including wound type cores, oil impregnation of transformer coils, street lighting transformers and silicone insulation. The adaptation in some form of all of these Kuhlman improvements by most other manufacturers has made the Kuhlman transformer one of the most copied transformers in the electrical industry.

This is a most important consideration for you the next time you buy transformers. And, if you haven't solved the question above as yet, look below.

Another Kuhlman first, the quick grip bushing

This is the old, time-consuming way to make a primary connection. Terminals had to be laboriously tightened onto line lead with wrench. Disconnecting took just as long.

Kuhlman "Quick-Grip" bushing clamp eliminates use of tools—cuts line connection time in half! A few simple twists of the knob shown on end of bushing clamps terminal firmly over lead.



This cross-section view illustrates "Quick-Grip's" simple operation. Line lead is inserted in bushing lead opening, then knob is turned to quickly and easily secure connection.

Here's the "Quick-Grip" in actual operation. Note how it not only speeds line connecting and disconnecting but also promotes safety since insulating knob eliminates possible contact by lineman with live parts.

Kuhlman ELECTRIC COMPANY, BAY CITY, MICHIGAN

A great name in transformers. Write for descriptive bulletins on Kuhlman power, distribution, dry type, Sel-Protekt and specialty units.

EXPORT REPRESENTATIVES: *International Standard Electric Corporation,* 67 Broad Street, New York 4, N. Y. Cable Address, Minrapleon, N. Y.